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Antidumping and the business cycle: Filing behavior and ITC decision making

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ANTIDUMPING AND THE BUSINESS CYCLE:
FILING BEHAVIOR AND ITC DECISION MAKING

A Thesis

Presented to the

Department of Economics

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the requirements for the Degree

MASTER OF ARTS

in

Economics

University of Nebraska at Omaha

by

Ke Yang

May 2002

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THESIS ACCEPTANCE

Acceptance for the faculty of the Graduate College,
University of Nebraska, in partial fulfillment of the
requirements for the degree of Master of Arts,
University of Nebraska at Omaha.

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Date April 1, 2002

To my parents

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ANTIDUMPING AND THE BUSINESS CYCLE: FILING BEHAVIOR AND ITC DECISION MAKING

Ke Yang, MA

University of Nebraska at Omaha, 2002

Advisor: Dr. Catherine Y. Co

Abstract

Since the first national antidumping law was established in Canada in 1904, antidumping policy has evolved constantly as a legal trade restriction under General Agreement on Tariff and Trade (GATT) provisions. This paper studies the determinants of antidumping filings by U.S. industries from 1980 to 1995 using panel count regression analysis. The paper also investigates factors that influence the International Trade Commission's (ITC) injury determinations over these cases. Considerable support is found for the importance of the business cycle in driving antidumping filings and affecting the ITC's injury determinations. Other important determinants include industries' capacity utilization ratio, industrial trade deficit, amendments to the antidumping law, country dummies, and so forth.

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1. Introduction

Since the first national antidumping law was established in Canada in 1904, antidumping policy has coexisted with and has been endorsed by the international trade system. In fact, it has evolved constantly as a legal trade restriction under General Agreement on Tariff and Trade (GATT) provisions. A number of major trading nations followed Canada and adopted this “innocent” solution to offset the adverse effects of foreign rivals’ dumping activities on the domestic economy. Such intention is documented in W. S. Fielding’s (Canadian Minister of Finance, 1904) proposal for the antidumping regulation:

“...We find today that the high tariff countries have adopted that method of trade which has now come to be known as slaughtering, or perhaps the word more frequently used is dumping; that is to say, that the trust or combine, having obtained command and control of its own market and finding that it will have a surplus of goods, sets out to obtain command of neighboring market will put aside all reasonable considerations with regard to the cost or fair price of the good; the only principle recognized is that the goods must be sold and the market obtained...This dumping then, is an evil and we propose to deal with it...Whenever it appears to the satisfaction of the minister of customs...that the export price...is less than the fair market value thereof, as determined according to the basis of value for duty provided in the Customs Act...such articles shall, in addition to the duty otherwise established, be subject to a special duty of customs equal to the difference between fair market value and such selling price.”(United States Tariff Commission, 1919, p.2)

In spite of being created as an ad hoc solution to protect domestic industries from injuries caused by imports sold at “less than fair value” (LTFV), the use of antidumping protection has proliferated over the past two decades. For example, all GATT member countries filed only about 10 antidumping petitions in the 1960s, while more than 1600 antidumping cases were filed during the 1980s. In the 1990s, about 2200 cases were filed.

Another noteworthy observation is that 29 countries had initiated antidumping petitions by the end of the 1990s, while only five countries, Canada, New Zealand, Australia, the United States and the European Community (EC), participated actively in the antidumping club in the 1980s (Prusa, 1999). The rapid expansion of the antidumping club and the surge in the number of alleged antidumping cases have raised fears that antidumping has been used far beyond its initial intention stated in the Canadian antidumping statute. Of all the issues negotiated under the Uruguay Round, antidumping was perhaps the most contentious. For instance, while in the Uruguay Round the World Trade Organization (WTO) restricted the use of voluntary export restraints (VER), it articulated the validity of the VER-like characteristics of antidumping. That is antidumping investigation proceedings may be suspended or terminated without antidumping duties when exporters voluntarily restrict trade or increase prices (Hindley and Messerlin, 1996). The decrease of the VER application and the increase of antidumping regulation make it reasonable to wonder whether antidumping law is simply another manifestation of trade protectionism—a substitute for tariffs. In a sense, “Antidumping is a threat to the liberal trading system that post-World War II Western leadership struggled courageously and effectively to create. It offers a GATT-legal mean to destroy the GATT system.” (Mastel, 1998, p.4)

This paper’s primary goal is to share insights into U.S. antidumping application, intending to answer the question what the determinants of industries’ filing decisions are as well as whether cases are judged strictly based on economic criteria articulated in the statute.

To estimate the industries' filing behavior, we study antidumping petitions by U.S. industries from 1980 to 1995, using panel data at the 4-digit Standard Industrial Code (SIC) level. Takacs (1981) and Finger (1981) provide a framework for estimating the demand for trade protection against the LTFV cases. Their findings show that the slowdown in both general and industry-specific economic activities, such as production and export, increases protectionist pressures.¹ Some recent empirical studies (i.e., Hansen and Prusa, 1997 and Leidy, 1997) find similar results, while Sabry (2000) argues that the likelihood of antidumping filings is an increasing function of the industrial capacity utilization ratio in cases of low-concentrated industries. A common theme in these studies is the impact of macroeconomic variables such as GNP level and real exchange rates. Interestingly, these studies come up with substantially different findings. Feinberg (1989), for example, finds that, for years between 1982 and 1987, the depreciation of the US dollar was significantly associated a higher incidence of antidumping petitions. Knetter and Prusa (2000), however, find overwhelming evidence that dollar appreciation would lead to an increase in antidumping petitions. They argue that US dollar depreciation decreases the import penetration ratio, making injury determination less likely and, thus, domestic industries would be less likely to file. To provide a clearer picture of how macroeconomic pressures affect the incidence of filing, this study is distinguished from previous works in using the business cycle as a proxy for general economic pressures. The detailed definition and the advantages of such a measurement

¹ Protectionist pressure is defined as the number of petitions for protection filed in a given year.

are specified in section 4. The impacts of other economic and non-economic factors on industries' filing decisions are also explored.

Our second objective is to estimate the determinants of the International Trade Commission's (ITC) material injury determinations, which allows for a two-sided (demand and supply) analysis of U.S. antidumping experience. In other words, by comparing the determinants of industries' filing decisions and those of the ITC's decisions, we analyze whether domestic industries strategically file antidumping cases based on anticipated outcomes of the ITC's decision, and whether the ITC is subject to the petitioners' pressure in demanding antidumping protections. According to U.S. antidumping law, the International Trade Administration (ITA) and the International Trade Commission are the agencies responsible for independent antidumping investigations. Since the criteria for LTFV test are often constructed in favor of domestic petitioners, the ITA was estimated to have rejected only five percent of the petitions filed during 1980-1988 (Hansen and Prusa, 1997). Because the ITC is the authority that makes the final determination on material injury investigation, it plays a crucial role in the administrative procedures of U.S. antidumping law. Therefore, we will focus on the determinants of the ITC's final injury decisions. A probit model is applied to model the ITC's decision-making behavior.

In theory, the use of administered trade protection granted by these agencies should be purely a function of the rules stipulated in the relevant trade laws. Therefore, if the ITC is an independent administrative agency, it should grant antidumping protection only when the case-specified economic data satisfy the material injury criteria. Therefore,

external pressures should not influence the ITC's final decisions (Hansen and Prusa, 1997). In other words, the ITC should be directed by the antidumping statute to consider only the industry-level economic measurements in determining material injury. Among these statutory requirements are evidences of deterioration of domestic sales, capacity utilization, employment, profits, etc. (Tharakan, 1991).² Thus, one would expect the estimation of such economic hardship experienced by the complaining industry to have been the only factor swaying the ITC's decisions. In practice, however, there are considerable questions about whether the procedure is impartial as is implied in the antidumping statute.³ A number of studies have modeled the ITC's decision-making procedure, in different approaches, weighting the impacts of various factors in predicting the investigation outcomes. J. Michael Finger is among the tireless critics of antidumping legislation. Finger et al. (1982) pioneer the efforts to question the apolitical nature of the ITC's decision-making processes. They find that for antidumping and countervailing duty cases filed between 1975 and 1979, political pressures, as measured by industry size and industrial concentration, exert statistically significant impacts on the outcomes of the ITC's injury determinations. Ensuing studies, however, raised considerable doubts on the importance of political pressure in the ITC's decisions. For example, Baldwin (1985) and Anderson (1993) argue that the ITC is most likely to make decisions based on a strict interpretation of the law, while Moore (1992) suggests that the ITC had been an imperfect barrier between vote-seeking politicians and protection-seeking interests.

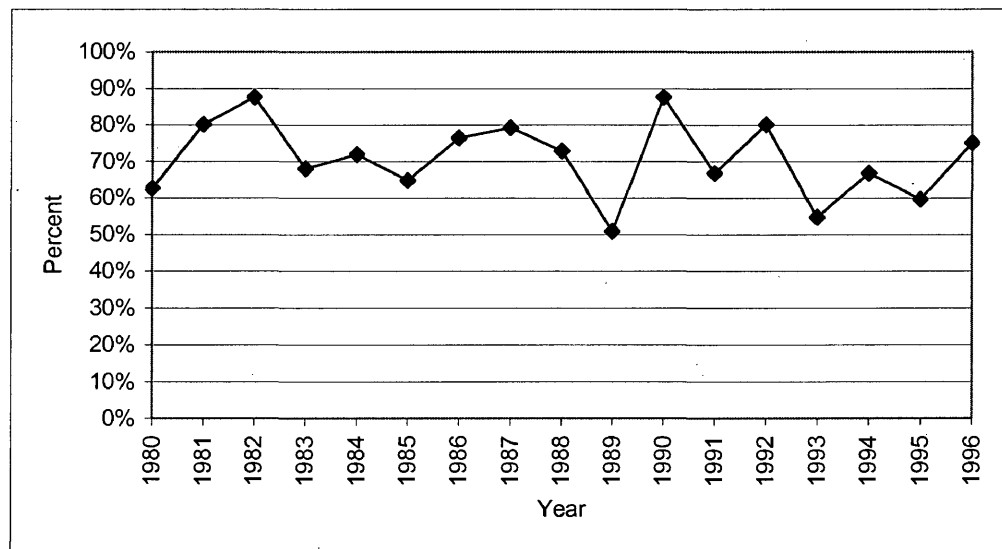
² An extensive list is provided in section 3.1.

³ In light of the capture theory of regulation, regulations are to serve producer interest by raising prices and reducing the number of competitors (William, 1972).

With the debate on the political influence continues, more recent studies have begun to look at the impacts of macroeconomic conditions on the outcomes of the ITC's injury investigation. Figure 1 provides a clear picture of the cyclical nature of the ITC's material injury decision making. It shows that since the economic contraction starting in the second half of 1981, the level of affirmative determination, as a percent of the total number of annual cases, had been rising and almost hit 90 percent in 1982. During the 8-year economic expansion starting in late 1982, however, the ratio of affirmative decision is around 70 percent. The rate increased to about 90 percent again when economy contracted in 1990. The observed cyclical behavior of the ITC's injury decisions over time may imply the ITC's vulnerability to general economic pressures.

Figure 1.

The Ratio of Affirmative ITC Final Material Injury Decision 1980-1996



An alternative explanation for such cyclical behavior is provided in Baldwin and Steagall (1994) emphasizing the Congresses' budgetary power. "In view of the frequent statements by many members of Congress that the ITC should be more willing to provide

protection against injurious imports and the well known readiness of Congress to use its budgetary power to influence behavior in the government, one would expect some collective pressure on commissioners to accommodate these congressional wishes in order to obtain the funding desired.” (Baldwin and Steagall, 1994 p.293) Based on such a notion, it is reasonable to expect that the ITC is more willing to grant affirmative injury findings during economic downturns to meet the Congresses’ protectionist tendencies.

One of this paper’s contributions is to use the business cycle as a proxy for macroeconomic conditions, while previous studies used GNP, unemployment rate, or the overall trade deficit to measure macroeconomic pressures (See Hansen and Prusa 1996, Leidy 1997, and Sabry 2000). Our utilization of the business cycle to capture cyclical macroeconomic conditions has several advantages over conventional approaches, which are specified in the empirical analysis section. We also include industry’s capacity utilization ratio, import-penetration ratio, and industry level trade deficit to test the importance of these statute-required indicators in affecting the ITC’s injury determinations. In addition to the above economic determinants, we also evaluate the importance of other factors such as industry size and country bias in influencing the ITC’s decisions. Inclusion of these variables would allow us to estimate the political nature of antidumping protection. For example, a larger industry might be able to impose greater political pressure on the ITC, hence is more likely to gain antidumping protection.

Literature on the effects of antidumping cases on the entire economy shares insights into the recent popularity of antidumping. Its effects on foreign direct investment (FDI), bilateral and multilateral trade flow, and domestic output and employment have

been most widely documented. The empirical findings of the seminal work of Staiger and Wolak (1994) indicate two non-duty effects of antidumping protection, namely “investigation effect” and “suspension effect”, are significant in restricting imports flow and expanding output of the import-competing domestic firms. For example, they find that investigation effect occurs when an antidumping investigation takes place. The success of simply initiating an antidumping investigation reduces total imports during the period of investigation by half the magnitude that would be expected if duties were imposed from the start of the investigation. Suspension effect occurs when an investigation is suspended under the promise by foreign exporters to stop dumping, which leads to trade restrictions similar in magnitude to what would have been expected if antidumping duties were imposed. Therefore, recognizing such non-duty effects, firms might file antidumping petitions with different filing strategies. The outcome filers seek the actual imposition of antidumping duties, while the process filers simply seek the restrictive effects of the investigation process alone.

Prusa (1996) using data for the 428 antidumping petitions filed between 1980 and 1988 also finds the trade restricting effects of antidumping investigations. The author looks at the trade effects of United States antidumping actions, focusing on the issue of trade diversion. His findings suggest that both the rejected cases and the cases with antidumping duties imposed have substantial trade-restrictive effect on the named country. Specifically, in the year following the final antidumping investigation decision, imports from named countries were 9 percent less than they were in the previous year for cases with affirmative findings. Surprisingly, the number for rejected cases is 16 percent.

In addition, significant trade diversion from the named countries to non-named countries was observed and was positively associated with the estimated duty. Numerically, while imports under antidumping investigation from named countries reduced substantially, the data showed a 22 percent increase in like imports from non-named countries during the year following the antidumping investigation. Collectively, import growth is hampered by the presence of antidumping protection, which, however, is mitigated greatly by the trade diversion effects. Such findings are consistent with the view that antidumping protection is country-biased in nature. Finally, Prusa (1996) asserts the counter competition effects of antidumping protection by pointing out the collusive pricing behavior between the domestic producers and their foreign rivals. For instance, by raising their dollar prices, foreign exporters provide higher profits margin for domestic producers in exchange for not being subject to antidumping allegations.

Another benefit of domestic petitioners from the antidumping protection is documented in Neiberging (1999). Using an empirical version of Lerner's index (defined as difference between price and marginal revenue), the author concludes that U.S. firms receiving antidumping protection significantly enhanced their domestic market power, while firms having their filings rejected suffer a decline in their market power. According to such empirical findings, we would expect the industries to make their filing decisions based on the likelihood of getting final antidumping protection.

Antidumping protection was also estimated to have significant effects on the flow of FDI. Studying the movements of Japanese FDI, Barrell and Pain (1999) conclude that the expansion of antidumping protection in the EC and the U.S. during the 1980s has

significantly raised the level of Japanese FDI in these countries. Specifically, their study shows that when the antidumping cases initiated in the U.S. was considerably higher than in the EC in the early 1980s, Japanese FDI to the U.S. expanded rapidly, while the EC market continued to be served by means of export sales. Such patterns remained until the late 1980s when antidumping cases became more frequent in the EC and Japanese FDI flowed into the EC dramatically. Their findings are consistent with the notion that antidumping has at times served the host country as a *de facto* trade policy to promote new investment, hence to increase its domestic employment. Therefore, FDI provides a means to bypass the non-tariff trade barriers, such as antidumping, as it does to avoid the regulation of tariff barriers.

The above empirical studies, along with many others (i.e. Webb, 1992, Conway and Dhar, 1994 and Gallaway et al., 1999), imply that antidumping has a strategic effect— it promotes domestic interests and stifles international competition rather than restore fairness to the trading system. If antidumping has indeed betrayed the basis of its traditional advocacy to simply protect domestic industries from injuries caused by foreign exporters' dumping practices, it is then necessary to investigate the factors involved in antidumping filing behavior and decision-making processes through the rigors of the econometrics testing. The U.S., one of the world's major antidumping petitioners, provides an excellent setting for such empirical estimation.

Before going any further, it is necessary to give a brief explanation of dumping, the evidence of which is the premise for initiating an antidumping investigation. An understanding of the economics of dumping will help us to analyze the fairness of the

antidumping legislation application. The remainder of the paper is structured as follows: An introduction to the economics of dumping and a historical review of the evolution of U.S. antidumping law are provided in the next section. In the third section, we give a broad review of the relevant antidumping theories and empirical studies. Specifications of the empirical models and data as well as the discussion of regression results appear in the fourth section. Concluding remarks are presented in the final section.

2. Background

2.1 Dumping

For a long time, exporting industries have used dumping, in one form or another, to compete in foreign markets. In the early sixteenth century, English scholars blamed foreigners for selling paper below the production costs to smother the infant paper industry in England. In the seventeenth century, Dutch merchants were charged with selling at detrimentally low price in Baltic regions to drive out their French competitors. In the eighteenth century, English manufactures were accused of invading the United States' market at ruinously low prices (Viner, 1923). In this section, we will look at two common strategies of current dumping activities and explain the economic rationales behind firms' willingness to sell below the best attainable market prices or even below costs. We also discuss the effects of such dumping activity on the importing country's economy.

The most widely used strategies for dumping are predatory pricing strategy and discriminatory monopoly strategy. Imperfect market structure created by a secured home market is a crucial premise for the success of such price dumping strategies. Predatory pricing is based on the belief that a firm may eventually drive its competitors out of business and gain monopoly power over the foreign market at the expense of short-run losses due to economically unjustified low prices. As long as the long-run monopolistic profits are greater than the short run losses, it would be worthwhile for firms to choose this strategy. The problem with such an explanation, however, is the fact that rational domestic firms would expect foreign sellers to raise prices eventually. Thus, they would try to retain their market shares by matching the lowered market prices, even at the expense of considerable short run loss. Therefore, successful implementation of such pricing strategy would require a sharp asymmetry in the amount of financial resources between foreign and domestic producers. Hence, a more reasonable approach is for both sides to collude on the market price rather than to compete with each other and drain their financial resources.

The feasibility of predatory pricing strategy has been of great interests to economists for a long time. Some scholars claim it to be baseless (McGee, 1958), while others, Tirole (1987) for example, find the possible circumstances for such pricing strategy. McGee (1958) argues that it was price discrimination rather than the widely believed predatory pricing that accounted for Standard Oil's pricing practice. According to McGee, it is rational for the predators to view the temporary loss as an investment in future monopoly profits only if the profits are expected to be constant and to exceed the

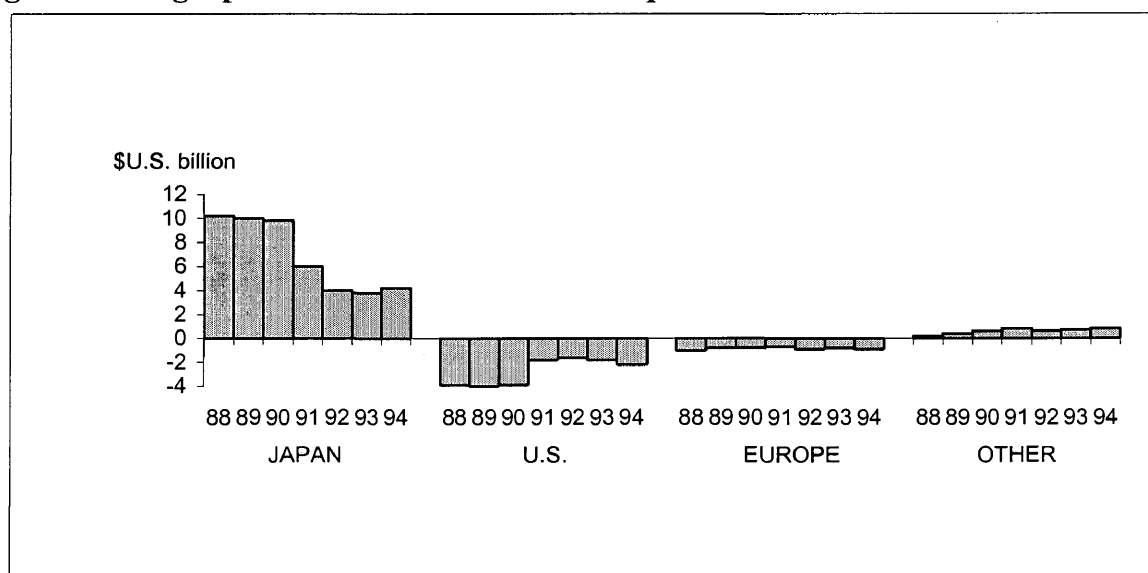
present size of loss to cover the appropriate discount, which is rarely evidenced in empirical cases. Tirole (1987), however, contends that a simple duopoly market structure combined with several restrictive conditions, such as substantial barriers, would fulfill the requirement of successful predatory pricing strategy. His model assumes that there are two firms, one domestic and one foreign. It is possible for the foreign firm to invade into the importing market through a price-dumping strategy and eventually secure monopoly market control. Therefore, such theoretical analysis, though restrictive, implies that the assertion of baseless predatory pricing strategy is too strong.

Another explanation to price-dumping behavior is the discriminatory monopoly strategy. It is a regular business practice aimed at more limited commercial objectives. Firms charge different prices in domestic and foreign markets to maximize profits, pursuing economies of scale, building up market share or simply disposing excess production capacity. In other words, firms adopt discriminatory monopoly strategy to price differentiate, not to drive their competitors out. Even in relatively low-concentrated industries, where economists have had difficulty offering a satisfactory economic rationale for dumping, such pricing strategy could be lucrative. One possibility is that firms in dumping industries may have such agreements as minimum price with the government in their home market and that they are unwilling to break these agreements. In such events, any excess supply that appears on the home market at the agreed price will be sold abroad at a lower price (Hindley, 1991).

In summary, despite potentially different intentions to dump, it has always been backed by an essential economic basis---the secured home market endorsed by a mixture

of economic and policy instruments, such as government-erected trade barriers (i.e. tariff), private-sector trade barriers (i.e. monopoly or oligopoly control), and subsidies (i.e. direct or indirect government subsidies). Such a nurturing environments provide an economic incentive for dumping. A tightly protected home market allows domestic companies to secure sufficiently high profits in the absence of foreign competition. The secured home market profits, then, cross-subsidize the exports at dumped prices to achieve economies of scale or to dispose of surplus production. Consequently, industries in open markets without instruments to level the market price suffer from a decrease in market share, depressed profit margin, and thus, decreased funds for R&D investment and marketing. Figure 2 provides vivid example of its successful cross-subsidization dumping strategy.

Figure 2. Geographic Sources of Profits for Japanese Automakers



Source: Mastel (1998)

Since the Japanese auto industry has great control over its domestic market with the aid of protective trade policies, the high prices charged in the home market yield

considerable profits, which are used to finance its price dumping in the developed markets such as the U.S. and Europe. A visual inspection of Figure 2 clearly shows that while the Japanese auto industry was making profits of about 10 billion dollars in its home market in 1988, its businesses operated in the U.S. and Europe experienced net losses of about \$4 billion and \$1 billion respectively. In addition, a comparison of the magnitude of losses among the three regions indicates that the opener the targeted market is, the larger the scale of dumping tends to be. For instance, among the three regions, the U.S. was well in advance promoting free trade policy, which made it easier for the Japanese auto producers to enter the market and dump their products in a large scale. As a result, the observed net loss of the Japanese auto industry in the United States appears to be the largest. Another interesting observation is that the magnitude of losses in the three foreign markets is positively related with that of its profits in the home market over time.

Figure 2 is consistent with the notion that a successful dumping strategy requires a highly protected home market to secure significant profits to finance the dumping in foreign markets. While promoting the global free trade system, open market countries would not allow such detrimental commercial conducts to stifle the production of their own industry. Hence, antidumping law was initiated to shelter these injured domestic industries from foreign rivals' unfair practices. In the next section, we look at the evolution of the antidumping regulation in a global context and its introduction into the U.S..

2.2 History of The Antidumping Law and The World Trade System

2.2.1 The Origin of The Antidumping Law–Canada, 1904

In 1904, Canada faced a political dilemma. Farmers lobbied for lower tariffs, while manufacturers lobbied for higher tariffs. This mixed pressure from farmers and manufacturers led the government to create a new trade policy instrument to satisfy both sides. Finger (1993) documents the invention of antidumping as Canada's contribution to the technique of trade restrictions in the history of commercial policy. New Zealand and Australia closely followed Canada and adopted antidumping laws in 1905 and 1906, respectively. With the surge in anti-German sentiments during the post World War I era, several countries—United States, Great Britain and most British Commonwealth countries—had joined the antidumping club by 1921. “It was a response to the alleged dumping threat posed by the highly cartelized and heavily protected German industry of the period.” (Staiger and Wolak, 1992 p.265) Further development of antidumping law continued through World War II. Most of the world economic powers had adopted some form of antidumping protection by the time of the Bretton Woods Conference in 1944.

2.2.2 Evolution of Antidumping Law in the U.S.

The first antidumping law in the United States incorporated several criteria from antitrust legislation, and thus is often viewed as an extension of three antitrust statutes—the Sherman Act, the Clayton Act and the Robinson-Putnam Act. However, the “antitrust” nature inherently limited the applicability of the 1916 antidumping law as stated in the ITC's 1919 review (Mastel, 1998, p. 19):

“[The 1916 act] apparently fails, where the Canadian law succeeds, in not contemplating in reasonable cases the prohibition of sporadic dumping, since its penalties apply only to persons who “commonly and systematically import” foreign articles, and in providing that such importation must be made with intent to injure, destroy, or prevent the establishment of an industry in this country, or to monopolize trade or commerce in the imported articles...”

Growing out of the failure of the 1916 Act is the 1921 antidumping law. This act is more closely modeled after the Canadian act. However, antidumping legislation had been generally ignored as a trade policy until the 1975-1979 period. The Tokyo Round of trade negotiation, which concluded in 1979, contained two key amendments. First, the definition of the LTFV imports was broadened to include imports priced below production costs. Second, the Tokyo Round Code revised the Kennedy Round Code and repealed the requirement that dumped imports be the demonstrably principal cause of material injury before duty could be imposed (Prusa and Skeath, 2001). In recent decades, the antidumping issue has been constantly brought to the negotiations under GATT. The Trade and Tariff Act of 1984 and the Uruguay Round Agreement Act of 1994, for example, have developed detailed instruction on the LTFV determination and the Sunset provision.⁴

A historical review shows that amendments have added considerable protective power to the antidumping legislation, hence strengthened petitioners' chances of getting trade protection. For instance, immediately after the Tokyo Round negotiation, 69 new antidumping cases were filed in 1980 and 150 cases in 1981 (Prusa and Skeath, 2001). The dramatic surge in the number of antidumping applications has raised great interests

⁴ Please refer to Appendix Table 1 for information that traces the major evolutions of U.S. antidumping law.

among economists. The next section reviews the literature on the administrative procedure of antidumping investigation in the U.S., and the determinants of the industries' decisions to file as well as those of the ITC's injury determinations.

3. Literature Review

Empirical studies related to U.S. antidumping application, filings and outcomes, are based on the understanding of its administrative investigation procedure conducted by the ITA and the ITC. Several previous studies documented the performance of the two agents or the individual commissioners involved in antidumping investigations. Jackson and Vermulst (1989), Staiger and Wolak (1994), and DeVault (1996), provide detailed background information of antidumping and its practice in the U.S. and in other major countries. Baldwin and Steagall (1994) document ITC commissioners' behaviors within the broad limit of U.S. antidumping law.

Our empirical study begins with a review of the procedure of U.S. antidumping administration, which clarifies the possible outcomes of the antidumping investigation, the responsibility of each party involved, and the timetable for the entire administrative procedure.

3.1 Procedure of U.S. Antidumping Investigation

Generally speaking, there are three possible outcomes for an antidumping petition: 1) dumping is found and antidumping duties are imposed on imports under investigation; 2) petition is terminated without duty imposed; 3) petition is suspended

with certain agreements to stop dumping reached between the exporting industry and the ITA. However, if the suspension agreement is violated, the case will restart at the point when suspension was reached.

Specifically, a termination without antidumping duty granted can result from a rejection by the ITA to initiate the case, a negative finding of ITC's preliminary investigation, a negative ITA final LTFV finding, or a negative ITC final injury determination. In addition, a case can also be terminated without antidumping duty imposed, simply because the petitioner withdraws the case.

According to U.S. antidumping law, two findings are necessary before final antidumping duties are imposed on the imports in question. First, the ITA must determine that the imports are being dumped at LTFV. Specifically, the imports are found to be sold at LTFV, if one of the following three situations is observed (Mastel, 1998): 1) imports are sold at prices below their home market prices; 2) imports are sold at prices less than those in the surrogate market; 3) in the cases lacking reliable information of the above criteria, demonstration that imports are priced below a constructed value, the costs of production, is applied.⁵

Second, the ITC is responsible for material injury determination. Tharakan (1991) provides a detailed description of the administrative system of the ITC, an independent agency composed of three Republicans and three Democrats. The commissioners are appointed by the president and confirmed by the U.S. senate for a nine-year term. The chairmanship of the ITC rotates between Republicans and Democrats every two years.

⁵ A surrogate market is the market of reference.

According to Tharakan (1991), U.S. antidumping law directs the ITC to consider the following eighteen factors in deciding material injury: the price of the dumped imports (price undercutting), increase in volume of dumped import, the price of the U.S. like product (price suppression or depression), domestic output, domestic sales, domestic inventories; domestic market share, output growth; the total volume of dumped imports, utilization of capacity, cash flow, profits, productivity, return on investment, ability to raise capital, employment, and wage.

The ITC must demonstrate that the imports under investigation are causing material injury to the domestic industry producing the same or like products.⁶ Unfortunately, the statutory measurement for material injury is neither quantitative nor operatively defined. U.S. antidumping law defines material injury as “harm that is not inconsequential, immaterial or unimportant”.⁷ Beyond the minimum level set for dumping margin and imports, there is no set level at which injury is certainly occurring or certainly not occurring.⁸ According to Article VI of the 1994 GATT, the term “injury” shall be taken to mean material injury to the domestic industry, threat of material injury to domestic industry or material retardation of the establishment of such an industry.

⁶ The GATT Code Article 2 interprets the term “like product” to be a product which is identical, i.e. alike in all respects to the product under consideration, or in the absence of such a product, another product which, although not alike in all respects, has characteristic closely resembling those of the product under consideration.

⁷ Tariff Act of 1930, Section 771 [7][A].

⁸ The minimum size of the dumping margin for antidumping duties to be imposed is 2 percent. To be subject to antidumping duties, imports from the alleged dumper must account for 3 percent of total imports.

Such vague statutory standards give the ITC considerable discretion in judging whether or not material injury occurred. In practice, each of the six ITC commissioners chooses his or her personal approach to investigate the injury. Kaplan (1991) does an excellent job in explaining the five commonly used approaches to reach material injury determinations in U.S. antidumping investigations.

Weak 201, the first approach, treats antidumping cases as analogous to the escape clause cases raised under Section 201 of the Trade Act of 1974.⁹ Affirmative material injury determination under this approach requires that the domestic industry be materially injured with dumped imports being the cause. However, standards required for a positive injury finding under the Weak 201 approach differ from those required in the escape cases investigations. The Weak 201 approach requires harm that is not inconsequential, immaterial or unimportant, while the escape clause investigation requires the harm to be serious and the imports to be the substantial cause.

Trend analysis, the second approach, is similar to Weak 201 in its requirement for the affirmative injury findings. However, trend analysis requires a direct causal link between the imports alone and material injury, while affirmative finding in Weak 201 approach simply requires the evidence that imports are among the causes of material injury.

⁹ Under Section 201, the ITC decides whether imports have been a substantial cause of serious injury to relevant domestic industries. If the ITC rules affirmatively, it makes recommendations to the president about temporary trade protection. No unfair trade practices need to be proved. If the president accepted the ITC's recommendation, trade restrictions are imposed on all countries' exports of affected product. However, trade compensation in form of lowered tariff on other products should be offered to the affected exporting nations (Krueger, 1996).

The Margin Analysis, the third approach, is characterized by its counterfactual framework: it considers what the condition of the domestic industry would have been had imports not been dumped. Commissioners employing such an approach would find the imports to cause injury if the dumping margins are greater than underselling margins.

An approach similar to the Marginal Analysis is the Comparative Analysis approach. Injury and cause are considered simultaneously in this approach. It proceeds in three steps. First, the dumping margin and other relevant information are used to evaluate the effect of dumping on the price of the LTFV imports. Then the price effect is related to the demand effect on domestic like products. Finally, the effects of the shifts in demand for the domestic like product is decomposed into a change in price and a change in quantity.

Finally, Five Factor analysis is similar to Weak 201 and Trend Analysis in its requirement for a separate material injury and causation tests. But it is distinguished by the requirement for evidence of predatory intent (Kaplan, 1991). The above five approaches cover commonly used methods by the ITC commissioners in their injury investigation. To understand the ITC's decision-making procedure, however, requires an integration of these approaches. As Kaplan cautions, reasoning from several of the approaches can be sometimes found in a single determination.

Mastel (1998) and Staiger and Wolak (1994) provide ample information on the timetable for the U.S. antidumping investigation process. According to U.S. antidumping law, once a case is filed by the domestic industry, the ITA has 20 days to determine whether the petition satisfies the basic requirements for subsequent investigation. If so,

four stages of subsequent administrative investigation begin with the ITC's preliminary injury determination.

After the case is filed by a domestic industry, the ITC has 45 days to make its preliminary determination of injury. If the petition fails the ITC preliminary determination, the petition is terminated. Otherwise, the investigation moves to its second stage-ITA preliminary LTFV determination.

The ITA preliminary LTFV finding must occur within 115 days of the ITC preliminary finding or within 160 days after the initial petition was filed. A finding of no dumping or a dumping margin of less than 2 percent would result in a negative finding, but will not terminate the case.¹⁰ If the finding is affirmative, the importers are subject to a "suspension of liquidation", which normally requires the importer to post a bond or a guaranteed payment of duty from this point on. Thus, the investigation moves to its third stage with either negative or affirmative result in the ITA preliminary determination.

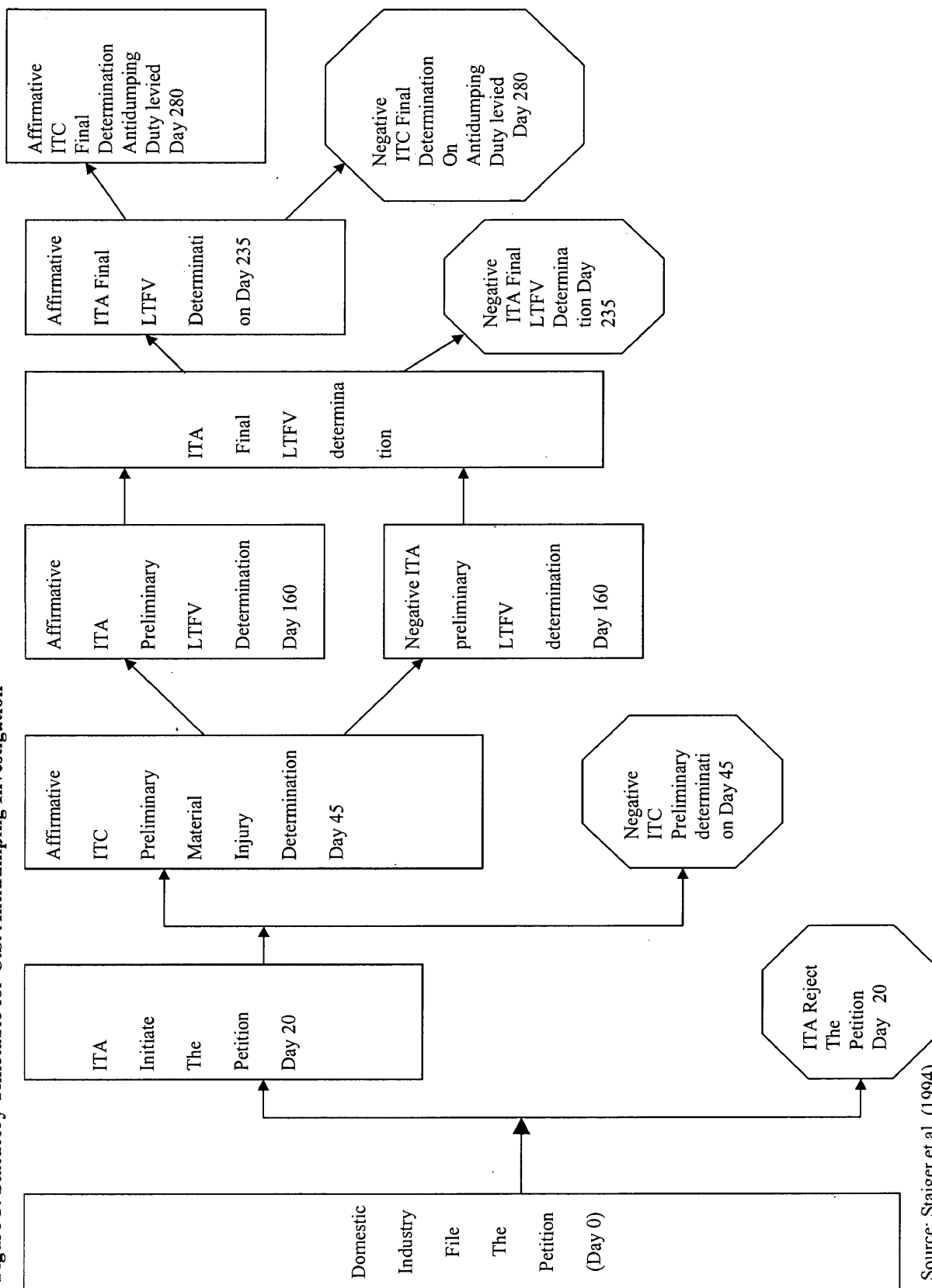
The ITA's final LTFV determination, based on further information and comments from previous investigation, must conclude within 75 days after its preliminary LTFV determination or 235 days after the petition was filed. If this final determination ends with a negative finding, the case is terminated. Otherwise, the investigation moves to its last stage.

ITC final determination comes within 45 days of the ITA final LTFV determination or 280 days after the case was filed. To reach a final affirmative "material injury" finding, at least 3 commissioners must come up with affirmative findings. If the

¹⁰ Dumping margin is the difference between the home market price and the export price; or more generally, the amount by which the normal value exceeds the export price.

final determination is negative, the case is terminated, the bond requirement repealed and no antidumping duty imposed. However, if the ITC final decision is affirmative, the ITA has 7 days to instruct customs to assess the appropriate antidumping duties. The time horizon over which the antidumping duties are imposed would be based on three possible situations. First, if the ITA preliminary LTFV determination is negative, duties equal to the dumping margins are imposed on or after the date of ITC final determination. Alternatively, if the ITA preliminary finding was affirmative, the duties equal to dumping margins are imposed back to the date of the suspension of liquidation. Finally, in case of critical circumstances, the duties will be imposed back to 90 days before the ITA preliminary determination. This process is summarized In Figure 3 adopted from Staiger and Wolak (1994).

Figure 3. Statutory Timetable for U.S. Antidumping Investigation



Source: Staiger et al. (1994)

3.2. Previous Empirical Studies¹¹

3.2.1 Industries' Antidumping Filing Behavior

The determinants and economic impacts of antidumping petitions have been of increasing interests to researchers in international economics and political economics. Takacs (1981) pioneers the research in this field. Using OLS, she estimates the trade related and domestic macroeconomic determinants of the number of requests for escape clause investigations and the proportion of successful escape clause cases in the U.S. during the period 1949-1979. She finds that fewer escape clause cases would be initiated when real GNP is higher, when the rate of capacity utilization is higher, when the unemployment rate is lower, when the trade deficit is lower, and when import penetration is lower.

The importance of industry level factors is also tested by Finger (1981), who finds negative effects of an increase in the industrial import penetration ratio and a decrease in the capacity utilization ratio on the incidence of LTFV complaints. The results of both studies suggest that deteriorations in both industry level and general economic performances increase demand for trade protections against LTFV imports. It is consistent with the conventional wisdom that it is relatively easy for a booming domestic economy to absorb competition from imports without imposing severe adjustment costs on domestic firms and workers. But any increase in imports will worsen the sluggish economic status, idle production capacity, and thus raise the unemployment rate and hurt domestic industries. Therefore, demand for trade protection is expected to vary with the

¹¹ For summary of selected empirical studies, use Appendix Table 2.

cyclical performance of the economy. In addition, Takacs' study also indicates a strong "demonstration effect", meaning higher success rate on cases filed in the previous year appears to encourage more petitions. Taken together, these findings imply that industries' filing decisions do not only depend on the presence of dumping activities but also hinge on the likelihood of getting affirmative injury determination from the ITC.

Importance of industry level determinants of antidumping filing decisions is found in recent studies using different models and covering wide time horizons. Herander and Schwartz (1984) analyze LTFV cases filed between 1976 and 1981. They find that increases in import penetration and the degree of domestic industry's unionization significantly raise the incidence of antidumping filings. Also indicated in their study is that the potential payoff from a successful antidumping petition, measured by the ratio of wage payments to value-added, is positively associated with filing incidences. Feinberg and Hirsch (1989) study LTFV cases filed between 1980 and 1986 using a Tobit model with 3-digit SIC level data. They find similar conclusions, indicating that large capital-intensive industries, particularly those facing decreasing employment and rising import penetration are most likely to file LTFV complaints.

Hansen (1990) uses a logit model to estimate LTFV cases investigated by the ITC between 1975 and 1984. She concludes that an increase in domestic industries' market share is negatively associated with their tendency to file antidumping petitions. Additionally, she also considers the effect of tariff protection granted to the petitioning industry and finds that industries with tariff protection are less likely to resort to antidumping investigation for help. For example, the textile industry is protected by

import quotas and, thus, is less likely to lobby for antidumping protection. Leidy (1997) estimates the response of petitioners to changes in the civilian unemployment rate and in the rate of industrial capacity utilization using an OLS model over a 10 years period, from 1986 to 1995. He finds industries are more likely to file antidumping petition, the higher the civilian unemployment rate and the lower the industry capacity utilization rate.

Krupp (1994) focusing on U.S. chemical industries, analyzes factors motivating the decision to file using a poisson model and panel data covering the period from 1976 to 1988. She finds that 1 percent increase in import penetration increased the likelihood of filing incidence by 4-11 percent and a 100-fold increase in the number of production workers raised the filing incidence by 2-4 percent. Besides, both the higher profit margin and the overall healthier performance of the chemical industry (measured by the chemical and allied products production index) are negatively associated with filing incidences. Sabry (2000) finds a positive relationship between the industry capacity utilization ratio and the likelihood of filing antidumping petition in the cases of lower concentrated industry.¹² For instance, assuming the import ratio is 50 percent, the probability of filing doubles as the capacity utilization of low-concentrated (HHI=400) industry doubles. She argues that a low concentrated industry stands a better chance of setting higher prices only if the market demand is high and capacity is constrained. Therefore, lower concentrated industries gain more from restricting imports when capacity utilization is high than when there is excess capacity and low demand.

¹² Her results show a positive sign for the interaction term of capacity utilization and a dummy variable for low-concentration industries.

An issue that is gaining increasing attention is the effect of macroeconomic factors on domestic industries' filing patterns. A few early works examine the effect of macroeconomic performance on the aggregated country level antidumping filing incidences. Feinberg (1989), for example, estimates the effect of exchange rate movements on U.S. antidumping petitions against four major trading partners (Brazil, Japan, Korea, and Mexico) from 1982 to 1987. His findings indicate that due to imperfect pass-through of the exchange rate, a depreciation of the US dollar leads to an immediate lower price of imports and, thus, increasing incidence in antidumping petitions. Leidy (1997), however, comes to a substantially different conclusion. His results imply that the surge in antidumping cases from 1981 to 1985 was due in part to the significant appreciation of the US dollar. Based on OLS regressions, he concludes, "...pressure for protection in the U.S. under AD/CVD have heightened during macroeconomic downturns and receded with higher level of resources utilization." (Leidy, 1997, p.132)

Knetter and Prusa (2000) also find little support to the imperfect pass-through effect of exchange rate movements found by Feinberg (1989). The authors estimate aggregate antidumping filings by U.S., Canada, EU and Australia from 1980 to 1998. Using OLS, poisson, and negative binominal regressions models, the authors find that a one-standard deviation real appreciation of the domestic currency increases filings by 33 percent. This is because US dollar depreciation makes foreign goods more expensive, which, in turn, decreases import penetration making an affirmative injury determination less likely. Industries basing their filing decisions on anticipated outcomes would be less likely to file. Empirical results also show that a one-standard deviation fall in the filing

country's real GDP growth leads to a 23 percent increase in antidumping filings. A similar negative relation is found by Takacs (1981). Collectively, these studies suggest that imports are more likely to be blamed for causing injurious effects when the overall economic condition is poor, implying the strategic motivation behind antidumping petitions.

Other industry characteristics are also found to be determinants of antidumping petitions. Both Finger (1981) and Feinberg and Hirsch (1989) use the size of petitioning industry as a proxy of the industry's political power and find that large industries are more likely to file antidumping petitions. Herander and Schwartz (1984) give additional consideration to the impact of potential payoff to the domestic industry from obtaining protections, which is measured by the ratio of wage payments to value-added at the 4-digit SIC level and the total value of industrial capital stock. Positive effects of both variables are found to be significant. Consistently, the positive effect of unionization indicates that the more organized is the labor force, the greater its ability to push its interests and, thus, the greater the likelihood the industry will lobby for trade protection.

The significance of these variables, therefore, implies that needs for restoration of a fair trading system cannot fully account for the observed antidumping filing patterns. Industries anticipate and incorporate the factors that affect the ITC's injury decision into their filing decisions. Hence, to obtain a comprehensive understanding of antidumping activities, a few studies such as Takacs (1981), Finger (1981), Herander and Schwartz (1984), Hansen (1990), and Leidy (1997) adopt a two-sides approach, addressing both the demand for and the supply of antidumping practice. One unique perspective of Hansen's

study is that it simultaneously accounts for the determinants of both demand and supply sides of policy protection. Her study suggests that, on the demand side, interest groups seek trade protection when they believe that the ensuing benefits are larger than the costs incurred. Industries self-select in their application for protection from the ITC. Therefore, the factors affecting the filing decisions are similar to those affecting the ITC's injury determination. Thus, by looking deeper into the supply side of the antidumping practice, we can better understand the implicit impetus behind allegations for antidumping protection.

As we will see, the empirical studies concerning the determinants of the injury investigation outcomes give consideration to a broad range of microeconomic, macroeconomic and political variables that may cause discretions in the ITC's decision making procedure. However, substantially different results are reported on the basis of different regression models with data across different periods.

3.2.2 The ITC's Decision Making

Finger (1981) studies the period between 1975 and 1979 and finds that variables such as industry import penetration and capacity utilization do affect the incidence of affirmative injury determination. Large industries are systematically favored by the ITC in granting trade protections. Since it is widely believed that the surge of antidumping activities in the U.S. cannot solely be explained by increases in unfair trade practices, recent studies have given increasing consideration to the effects of variables such as industries' political power. However, there is no consensus as to their impacts.

Baldwin (1985) maintains that the statutory requirement should keep the ITC impartial and insulated from outside pressures. He argues that in the semi-judicial working environment, impartiality and technical competence tend to be the best ways for individual commissioners to gain the respect of fellow commissioners and outside groups. Therefore, a commissioner is most likely to make decisions based on a strict interpretation of the antidumping statute by following a measurable set of economic standards in material injury determinations. Goldstein and Lenway (1989) reaffirm the apolitical nature of the ITC's determinations. They use principal-agent theory to examine the relationship between Congress and the ITC through the estimation of escape clause cases. Their empirical results suggest that political forces in Congress do not have a direct influence on the ITC. In contrast to Finger (1981) and Baldwin (1985), however, the authors claim that the estimated insignificant coefficients on industry-specific variables such as shipments, import level, and employment changes suggest that the ITC develops its own criteria that are wholly independent of the statutory requirements. Such a claim is opposed to findings of ensuing studies (See e.g., Hansen, 1990 and Moore 1992) and may suffer from measurement and specification problems.

Hansen (1990) applies a nested-logit model to test both the demand for and the supply of trade protection from 1974 through 1984, challenging the insignificance of political pressure claimed in the above studies. Her results suggest that outcomes of the ITC injury investigation are subject to domestic political forces. Specifically, she finds that larger industries located in a district whose senator is a Democrat and a member of Trade Subcommittee of the Ways and Means or whose Representative is the Chair of the

Ways and Means Committee stand a better chance of getting an affirmative injury determination. Moore (1992) analyzes the individual ITC commissioners' antidumping decisions between 1980 and 1986, using a standard probit model. His findings suggest that although commissioners use criteria consistent with the instruction set forth in the legislation, the ITC has been an imperfect barrier between vote-seeking politicians and protection-seeking interests. "While the success of an industry in obtaining relief in the antidumping process depends on the objective facts of its petition, those fortunate enough to be represented by strategically placed politicians are more likely to be successful in obtaining protection." (Moore, 1992 p.465) For example, Moore (1992) finds that falling production and increased volume of allegedly dumped imports are important factors in the commissioners' decisions. On the other hand, the evidence also shows that petitions involving the constituencies of the Senate Trade Subcommittee are systematically favored. The latter result, however, should be interpreted with caution as the author notes that industries in the districts of members of the House Trade Subcommittee are more likely to get a negative finding when the final decision are analyzed separately.

Baldwin and Steagall (1994) reaffirm the importance of industrial economic variables with a more recent sample covering antidumping and countervailing cases determined between 1980 and 1990. The authors, however, emphasize the political economy perspective of the ITC's decisions implied in the estimation results. The insignificant 'penetration of unfair imports' in their study indicates that the ITC does not require a tight causal relationship between unfair trade and material injury. Rather, the increase in industry openness to all imports is blamed for the injurious effects. In

addition, the authors point out that since the commissioners are nominated by the President and confirmed by the Senate, they are likely to serve the trade policy objectives of these politicians who seek to maximize the political support of electorates. In the height of the Cold War, for example, U.S. trade policy is directed to maintain an open domestic market in order to secure the political alignments with non-communist nations. For example, the standard for obtaining protection via the escape clause was raised in the Trade Expansion Act of 1962 by requiring petitioners to demonstrate that the increase in imports causing injury resulted primarily from prior trade agreement concessions (Takacs, 1981). In contrast, the antidumping and countervailing duty (CVD) protection in the 1980s manifested the increasing public concerns about U.S. industries' international competitiveness. The shift towards more protectionist sentiments among the public allowed U.S. politicians to tighten trade policy and to favor particular industries. Consequently, industries important in employment and political contributions were more likely get trade protection from ITC.

Another issue related to the ITC's impartiality in making decisions is its vulnerability towards general economic pressures. Takacs (1981) uses OLS to estimate the impact of macroeconomic factors on the number of escape clause cases filed between 1962 and 1979. While asserting the significant negative relation between the overall domestic economic health and the annual number of the United States escape case filings, she finds little evidence that macroeconomic conditions (measured by real GNP level and unemployment rate) have impacts on the ITC's decisions. In other words, although the demand for protection heightened during economic downturns, administration authorities

do not seem to succumb to increased protectionist pressures. The author interprets the observed ITC's immunity toward outside pressures as the government's reluctance to duplicate the counterproductive beggar-thy-neighbor policies of the 1930s.

Hansen (1990) challenges Takacs' claim by showing that decreases in national employment is a good predictor for getting protection from the ITC. Moore (1992) revisits the issue and verifies the importance of macroeconomic factors. Hansen and Prusa (1997) postulate that the two-dimension effects of the macroeconomic factors accounts for the statistically insignificant macroeconomic variables in their estimation. According to their interpretation, while a large trade deficit may exert additional political pressure on the ITC to provide trade relief, economic recessions would make it harder for petitioning industries to prove that unfair trade is causing injuries. Mah (2000) estimates the effects of domestic as well as international general economic conditions on the ITC's injury determination. Using data from 1975 to 1994 and using an error correction model, he finds that "...there is a long run equilibrium relationship between growth rate of percentage of affirmative antidumping decision and real GNP growth rate..."(Mah, 2000 p.1708).

Sabry (2000) uses univariate probit and bivariate probit models with sample selection to study what factors affect the probability of filing antidumping petitions, the dumping margin estimates and the probability of successful petitions between 1986 and 1992. Her results are generally similar to those of previous studies. Highly concentrated industries are more likely to file antidumping petition and the ITC is not insulated from outside political and general economic pressures in making its injury determination.

Interestingly, she finds that industries with low concentration will file antidumping petitions only when demand increases to a high level. This result is in contrast to the conventional wisdom that pressure for protection builds up when the industry's economic condition deteriorates. According to Sabry (2000), market competition would keep price at marginal cost when there is excess production capacity. Since firms in low-concentrated industries have little power over setting prices, when there is excess production capacity, an increase in demand would not put upward pressure on prices. When capacity is constrained, however, a perfectly competitive industry gains the power to increase prices, hence would have an incentive to restrict the entry of imports for higher profits. There is no incentive for firms to initiate antidumping petitions till the gain outweighs the burdensome legislation costs.

One common theme behind these studies is whether or not macroeconomic determinants affect industries' filing decisions and the ITC's injury determinations. Some of the most widely used macroeconomic measurements include real GNP level and unemployment rate (Takacs, 1981), percentage change U.S. trade deficits (Hansen, 1990), and change in production employment (Moore, 1992). Our empirical analysis is distinguished from previous studies by using a different measurement of the macroeconomic variable. In the next section, we develop the econometric models to test the effect of macroeconomic pressures on both the industries' filing decisions and the ITC's injury decisions. Other determinants are also estimated.

4. Econometric Models and Data

In this section, we present the econometric models used to estimate the determinants of industries' antidumping filing decisions and outcomes of the ITC's injury determinations. Our primary goal is to test whether industries' filing behavior and the outcomes of the ITC's injury determinations would vary over economic upturns and downturns. For example, we attempt to estimate whether industries are more likely to file antidumping petitions during economic downturns and whether the ITC would be more likely to vote to protect when the domestic economy is faltering. Our methodology consists of applying panel count regressions to test the industries' filing behavior and a standard probit model to investigate determinants of the ITC's final injury decisions.

4.1 Data

The antidumping case data used in this paper are provided by Blonigen.¹³ Only U.S. antidumping cases filed between 1980 and 1995 are selected because of significant changes in U.S. antidumping law in 1979. We restrict our sample to cases filed by firms in manufacturing industries. This consists of 94 percent of all cases filed.¹⁴ Thus, antidumping cases filed between 1980 and 1995 at 4-digit SIC level for manufacturing industries constitute our panel data. We estimate an unbalanced panel with 1281 observations because data for some industries are missing for some years. As for the analysis of the determinants of the ITC's decisions, we collected all U.S. antidumping

¹³ Please refer to Data Appendix.

¹⁴ Appendix Table 3 reports the number of antidumping cases filed between 1980 and 1995 at 2-digit SIC level for manufacturing industries.

cases that reach the final ITC determination between 1980 and 1996. This gives us totally 480 cases. This sample is selected for two reasons: First, since the criteria for LTFV test is often constructed in favor of domestic petitioners, ITA rejects only five percent of the petitions. In this sense, ITC's decision making plays a crucial role in judging the fairness of the U.S. antidumping administration. Second, since the material injury standard for final decisions is weaker than that for preliminary decision, the ITC is more vulnerable to outside pressures in making the final determination (Baldwin and Steagall, 1994). Detailed description of the data and their sources appear in the data appendix. Descriptive statistics and the variables correlation coefficients appear in Appendix Table 4 and 5.

4.2.1 Modeling Industries' Filing Decisions

To estimate the determinants of U.S. industries' decision making behavior in filing antidumping petitions, we use poisson panel regression. The dependent variable used is the annual count of antidumping petitions filed by each industry (on a 4-digit SIC basis) from 1980 to 1995. Among a variety of models constructed for estimating count data, the poisson regression model is most widely used. Since the annual number of antidumping petitions filed is non-negative number with mean value smaller than 5, applying OLS model to count data can result in inefficient, inconsistent, and biased estimates (Long, 1997).

We assume that the annual counts have a poisson distribution with a conditional mean, μ_{it} , that is a function of the independent variables contained in the matrix x_{it} .

$$Y_{it} \sim P[\mu_{it} = \alpha_i \lambda_{it}]$$

$$\lambda_{it} = e^{x_{it}'\beta}, \quad i = 1 \dots N, t = 1 \dots T$$

where Y_{it} is the annual count of antidumping cases filed an industry. β is the vector of coefficients. x_{it} is a matrix containing following independent variables: $[CYCLE_{it}, CAP_{it}, IMPR_{it}, DEFICIT_{it}, SIZE_{it}, CUMUL_{it}]^{15}$, and α_i s are the industrial-specific parameters. i indexes N industries and t indexes T years. $CYCLE$ measures macroeconomic conditions and is calculated as the portion of each year counted into economic upturns. CAP is defined as percent of the establishments' maximum level of production capacity is being used. $IMPR$ is industry import penetration ratio. It is defined as the ratio of industry imports to the sum of industry output and imports. Industry trade deficit is measured by $DEFICIT$, which is calculated by subtracting industry's annual imports value from its annual exports value. $SIZE$ is included as a proxy for industries' political power and is measured by the value of industry shipments. Finally, $CUMUL$ is a year dummy for 1984 onwards selected as a control for the possible effect of "mandatory cumulating" amendment enacted in 1984. We choose the poisson distribution to apply the conditional maximum likelihood estimation. Following Cameron and Trivedi (1998), a fixed-effect specification is defined as

$$\Pr \left[y_{it}, \dots, y_{iT} \mid \alpha_i, \beta, \sum_t y_{it} \right] = \frac{(\sum_t y_{it})!}{\prod_t Y_{it}!} \times \prod_t \left(\frac{\exp(x'_{it}\beta)}{\sum_s \exp(x'_{is}\beta)} \right)^{y_{it}} \quad (1)$$

Thus, the conditional log-likelihood function is as follows:

$$L_c(\beta) = \prod_{i=1}^N \left[\ln \left(\sum_{t=1}^T y_{it} \right)! - \sum_{t=1}^T \ln(y_{it}!) + \sum_{t=1}^T y_{it} \ln \left(\frac{\exp(x'_{it}\beta)}{\sum_{s=1}^T \exp(x'_{is}\beta)} \right) \right] \quad (2)$$

¹⁵ Please refer to Table 1 for variable construction details.

The standard poisson regression model assumes equality between the conditional mean and the conditional variance of the counts. In practice, this feature can be violated with the conditional variance being greater than the conditional mean, which is known as over-dispersion. It might be caused by unobserved heterogeneity, which is not controlled by the panel data. A class of models has been constructed to account for over-dispersion by mixing the poisson distribution with a second distribution. In present study, we estimate the negative binominal (NB) model, where y_{it} has an NB distribution with mean $\frac{\alpha_i \lambda_{it}}{\phi_i}$ and variance $\frac{\alpha_i \lambda_{it}}{\phi_i} \times (1 + \frac{\alpha_i}{\phi_i})$. α_i and λ_{it} are defined in the above poisson model. ϕ_i is the negative binominal over-dispersion parameter, with a Gamma distribution. For a fixed-effect NB model, the conditional maximum likelihood approach is defined as follows:

$$\Pr \left[y_{it}, \dots, y_{iT} \mid \sum_{t=1}^T y_{it} \right] = \left(\prod_t \frac{\Gamma(\lambda_{it} + y_{it})}{\Gamma(\lambda_{it}) \Gamma(y_{it} + 1)} \right) \times \frac{\Gamma(\sum_t \lambda_{it}) \Gamma(\sum_t y_{it} + 1)}{\Gamma(\sum_t \lambda_{it} + \sum_t y_{it})} \quad (3)$$

Where $\Gamma(\cdot)$ denotes the Gamma function defined as $\Gamma(v) = \int_0^\infty t^{v-1} e^{-t} dt$. The log-likelihood function is then specified as follows:¹⁶

$$L_c(\beta) = \sum_{i=1}^N \left[\ln \Gamma \left(\sum_{t=1}^T \lambda_{it} \right) + \ln \Gamma \left(\sum_{t=1}^T y_{it} + 1 \right) - \ln \Gamma \left(\sum_{t=1}^T \lambda_{it} + \sum_{t=1}^T y_{it} \right) + \sum_{t=1}^T \{ \ln \Gamma(\lambda_{it} + y_{it}) - \ln \Gamma(\lambda_{it}) - \ln \Gamma(y_{it} + 1) \} \right] \quad (4)$$

The central issue is to estimate how U.S. industries' filing behavior varies with the business cycle. According to conventional studies, antidumping law is not unlike other

¹⁶ See Cameron and Trivedi (1998) for details.

regular trade protection instruments, providing a shelter to protect domestic industry from foreign competition. Struggling with declined consumption demand, decreased profitability or increased idle production capacity during economic downturns, domestic industries are more likely to seek antidumping protection for economic relief. It is also plausible that domestic industries would expect their petitions to be more appealing given the overall poor economic condition, since the ITC is less likely to upset the petitioners due to increased protectionist sentiments among the general public during an economic downturn. Therefore, domestic industries are more likely to file antidumping cases during economic downturns when they stand a better chance of getting affirmative injury determinations.

An alternative strategic filing behavior is proposed by Prusa (1992) and Staiger and Wolak (1994). The authors argue that domestic industries might file antidumping petitions simply for the trade deterring effect of the investigation itself rather than the imposition of antidumping duties (Prusa, 1992). For example, Prusa (1992) finds that, on average, about one-third of the total antidumping cases filed between 1980 and 1985 were withdrawn. Taken together, these suggest a counter cyclical behavior of filing decisions against the business cycle. Thus, we expect CYCLE to have a negative sign.

Three industry level economic variables are included. Capacity utilization ratio (CAP) is expected to have a negative sign, while import penetration ratio (IMPR) is expected to have a positive sign. Trade deficit (DEFICIT) is expected to be negatively associated with the incidence of antidumping filings. Capital utilization ratio directly measures the performance of the domestic industries. Lower CAP implies higher fixed

production cost per unit of production, which decreases the industry's profitability and motivates industries to lobby for trade protection. Industries facing increasing IMPR or decreasing DEFICIT are more likely to file antidumping petition. This is because increasing import-penetration means shrinking market share for domestic producers, leading them to lobby for protections in an effort to secure their market shares and relieve them of competition pressures from foreign rivals. In addition, since an increase in IMPR and a decrease in CAP are among the statutory requirements for an affirmative injury determination, the suffering industries would have a greater chance of getting antidumping protection. Therefore, they are more likely to resort to antidumping petition for trade protection in the face of lower CAP, higher IMPR and lower DEFICIT.

We also hypothesize that larger industries are more likely to file antidumping petitions. Filing an antidumping petition, a costly administrative option, incurs burdensome legislation costs need to be backed by well-organized administration system and financial support. In addition, large industries often give large political contributions hence have greater political power to lobby for protection. Therefore, it is reasonable to expect that industries with larger SIZE to initiate more antidumping cases.

Finally, CUMUL is expected to have a positive sign. "Mandatory cumulating" amendment enacted in 1984 (CUMUL) is generally believed to have eased the standards for affirmative material injury determination. Since the effects of alleged dumped imports are now evaluated additively, non-named countries might be more cautious raising their exports. Thus, cumulation amendment also helps to prevent the trade diversion effects from the named countries to the non-named countries (Blonigen and Prusa, 2001).

Industry would perceive such amendment as a shift towards protectionism that increases their benefit from and chances of getting antidumping protection.

The effects are summarized in Table 1. Descriptive statistics for all variables are summarized in Appendix Table 4. In the next section, we present the empirical results from different specifications of the count model. Validity of the estimates is discussed with formal tests.

Table 1. Predicted Effects of Independent Variables — Filing Decision

Variable Name	Definition	Expected Sign
<i>Macroeconomic variable</i> CYCLE	<ul style="list-style-type: none"> Business cycle Calculated as the portion of each year that is in economic upturns: $CYCLE_t = \frac{\text{months of economic upturn}}{12}$ 	Negative
<i>Industry-level economic variable</i> CAP	<ul style="list-style-type: none"> Industry capacity utilization ratio. Defined as percent of the establishments' maximum level of production capacity is being used CAP_{t-1}* 	Negative
IMPR	<ul style="list-style-type: none"> Import-penetration Ratio. Calculated as $\frac{\text{import}_{t-1}}{\text{output}_{t-1} + \text{import}_{t-1}}$ 	Positive
DEFICIT	<ul style="list-style-type: none"> Trade deficit of the Industry under investigation. Calculated as $\text{Value of Exports}_{t-1} - \text{Value of Imports}_{t-1}$ 	Negative
<i>Other variables</i>		
SIZE	<ul style="list-style-type: none"> The size of petitioning industry, measured by the value of industry shipments (in million dollars) 	Positive
CUMUL	<ul style="list-style-type: none"> Dummy variable to estimate the effect of 1984 "mandatory cumulating" amendment to the antidumping law $CUMUL_t = 1, \text{ for } 1984 \text{ and thereafter}$ $CUMUL_t = 0, \text{ otherwise}$ 	Positive

* t : The year case is filed

4.2.2 Analysis of Results

Columns two through five of Table 2 present the coefficient estimates for the poisson and NB models respectively. Likelihood ratio tests indicate that the use of panel regression is appropriate for either the poisson or NB models.¹⁷

To address potential over-dispersion, we perform both poisson and NB models. Comparing the values of Wald Chi-squared statistics, we find that neither fixed effect nor random effect specification of the NB model is significant at the 10 percent significance level. Therefore, we cannot reject the null hypothesis that the independent variables are jointly insignificant, $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$. In contrast, the Wald test statistics for poisson model are significant at the 1 percent level of significance, which resoundingly rejected the null hypothesis, $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$. Our finding of the better performance of poisson model is theoretically predicted by Cameron and Trivedi (1998). As the authors point out, a common reason for using the NB model with cross-section data is to control for unobserved heterogeneity. The use of panel regression already controls for unobserved heterogeneity, and the use of poisson panel regression is sufficient. Hence, we will focus on analyzing the regression results from the poisson model.

Results from both the fixed effects and random effects models are presented in Table 2. Hausman test indicates that the fixed effects model is preferred. Specifically, the calculated Hausman test statistics is significant at the 1 percent significance level.

¹⁷ Results of Pooled poisson, NB, and ZIP models are quantitatively similar. Please refer to Appendix Table 6.

Table 2.
Poisson and Negative Binominal Estimation on Industries' Filing Decision^{a/}

Variable	Poisson Regression		Negative Binominal Regression	
	Fixed Effect	Random Effect	Fixed Effect	Random Effect
Constant	-	0.32099	-1.21698**	-1.61662**
	-	(0.372)	(0.041)	(0.003)
CYCLE	-0.42294**	-0.36660*	-0.34633	-0.29136
	(0.035)	(0.066)	(0.347)	(0.430)
CAP	-0.01783**	-0.01697**	-0.01060	-0.00513
	(0.000)	(0.000)	(0.131)	(0.423)
IMPR	0.01879	0.00777	-0.00739	0.00151
	(0.111)	(0.375)	(0.486)	(0.833)
DEFICIT	0.00005**	0.00002	-0.00002	2.15E-06
	(0.002)	(0.218)	(0.489)	(0.899)
SIZE	2.87E-06	8.21E-06**	8.29E-06**	7.53E-06**
	(0.405)	(0.001)	(0.024)	(0.021)
CUMUL	0.46239**	0.44867**	0.26779	0.20238
	(0.002)	(0.002)	(0.313)	(0.433)
Number of Observations	1281	1281	1281	1281
Likelihood ratio test ^{b/}		1429.67 (df=01)		81.46 (df=01)
Wald ChiSquare Statistics	32.78 (df= 6)	30.73 (df= 6)	9.01 (df= 6)	7.35 (df= 6)
Hausman test	57.62 (df= 6)		7.22 (df= 6)	

Notes: a/ the numbers in parentheses are the p-values

b/ likelihood ratio test of $\alpha = 0$; the statistics follow a χ^2 distribution

* Indicates statistical significance at the 10% level with two-tailed test.

**Indicates statistical significance at the 5% level with two-tailed test.

As shown in Table 2, CYCLE, CAP and CUMUL are statistically significant at the 5 percent significance level with expected signs. DEFICIT is statistically significant at the 5 percent significance level but with an unexpected positive sign. IMPR and SIZE are not statistically significant.

The estimation results indicate that antidumping filings are negatively affected by the business cycle. Specifically, industries file more antidumping petitions during economic downturns and less during economic upturns. Such empirical finding lends support to the notion that domestic industries tend to seek relief from trade policy to block out their foreign rivals, in the face of declining demand and increasing unemployment during economic slowdown (Takacs, 1981). Like wise, Leidy (1997) reports a negative relationship between the number of antidumping/countervailing petitions and the well-being of the overall domestic economy during 1986-1995. Knetter and Prusa (2000) study a larger sample of U.S. aggregated antidumping filings covering 1980 through 1998. They also find that declines in real GDP lead to increased antidumping filings. Our estimation results are in line with the notion that industries based their filing decisions on anticipated likelihood of getting protection. Industry performance is adversely affected during economic downturns making it more likely to satisfy the statutory requirements for affirmative injury determination. On the other hand, protectionist sentiment among the general public rises during economic downturns adding pressure on the ITC to grant protection. Therefore, domestic industries would reasonably perceive economic slowdowns as a 'good time' for better chances of getting antidumping protection and increase filing incidence accordingly.

As expected, a decrease in CAP indicates that idled production facilities and partially operating workforce decrease profitability. Therefore, the suffered industry would increase antidumping filings for economic relief. The observed negative relationship between industrial capacity utilization ratio and the incidence of antidumping

filings is consistent with the empirical findings of previous studies, such as Coughlin et al. (1989), Staiger and Wolak (1994), and Leidy (1997).

Interestingly, the significant positive sign of DEFICIT implies that a relative increase in industry trade surplus motivates industries to file more antidumping petitions. This result is contrary to our initial expectations and to findings from previous studies such as Coughlin et al. (1989), where the author report that a deterioration of industry trade balance significantly increases antidumping filing incidence. Instead, results may reflect antidumping petitioners' strategic motivations. For example, an increasing trade surplus may reflect the domestic products' advantage over their foreign counterparts. The shift of market demand towards domestic products will put pressure on foreign producers. As response, a common marketing strategy employed by foreign producers is to reduce prices. Therefore, domestic industries may file antidumping petition as a precaution to secure the trade-restricting effects of antidumping investigation rather than to look for the final antidumping duties. In other words, antidumping petition is used strategically to maintain domestic industries' competitiveness rather than to restore their economic well-being from injuries caused by unfair trade practice. Since the trade deterring effect of antidumping investigation has been well documented in relevant literature (i.e. Prusa, 1992 and Staiger and Wolak, 1994), such strategic motivation constitutes a reasonable explanation for the observed filing pattern in our sample. In this regard, our finding lends support to the notion that an increase in dumping activity cannot fully account for the dramatic surge of antidumping in 1980s, implicit in which is the abuse of antidumping law through strategic filings (Prusa and Skeath, 2001).

Finally, “cumulation amendment” is estimated to significantly drive up the antidumping filing incidences, confirming the widely held belief that “cumulation amendment” increases the chance of an ITC’s affirmative injury determination. Industries anticipate and incorporate such non-economic determinants of the ITC’s decision into their filing decisions.

4.2.3 An Issue With the Steel and Steel Related Industries

Another common consideration in previous studies is the extensive use of antidumping law by steel and steel related industries (Blonigen and Prusa, 2001). A brief review of Appendix Table 4 shows that the largest annual filing number is 56, while the mean value is only 0.5363. Implicit in such observation is the presence of strikingly large antidumping petitioners in our sample, namely, the steel and steel related industries. For example, steel and steel related industries filed 50, 44 and 56, antidumping petitions in year 1982, 1985 and 1992 respectively. Previous studies also suggest that steel industry has been effectively filing large number of antidumping petitions with the ITC due to its political power and the learning-by-doing effect (Moore, 1992 and Sabry, 2000). President G.W. Bush’s recent 30 percent import tariff granted to the steel industry is simply another demonstration of steel industry’s political influence. Thus, it is reasonable for us to test whether the above results are sensitive to the inclusion of steel and steel related industries in our sample. In Table 3, we present the estimates for the poisson panel model excluding steel and steel related industries.

Table 3.
Poisson Estimation on Non-Steel Industries' Filing Decision^{a/}

Variable	Fixed Effect	Random Effect
Constant	-	-2.10264**
	-	(0.000)
CYCLE	0.26406	0.29101
	(0.391)	(0.340)
CAP	-0.01488**	-0.01468**
	(0.014)	(0.011)
IMPR	-0.12864	-0.00363
	(0.360)	(0.731)
DEFICIT	0.00003*	0.00003*
	(0.080)	(0.098)
SIZE	-6.89E-07	3.58E-06
	(0.880)	(0.283)
CUMUL	0.46815**	0.34700**
	(0.030)	(0.0095)
Number of Observations	1027	1027
Likelihood Ratio test ^{b/}		814.67(df=01)
Wald Chi2	19.66 (df= 6)	17.56 (df= 6)
Hausman test	0.5414 (df= 6)	

Notes: a/ the numbers in parentheses are the p-values

b/ likelihood ratio test of $\alpha = 0$; the statistics follow a χ^2 distribution

* Indicates statistical significance at the 10% level with two-tailed test.

**Indicates statistical significance at the 5% level with two-tailed test.

The results in Table 3 are quantitatively similar to those in Table 2 except for CYCLE. CYCLE is no longer significant at the 10 percent significance level. The insignificant coefficient estimate for CYCLE suggests that steel and steel related industries' filing behavior is more sensitive to the business cycle than all other industries. Since steel and steel related industries are characterized by economies of scale, their profitability is more sensitive to demand due to large fixed production costs. Besides, the

steel industry is closely connected with a wide range of other economic sectors, such as auto industry and construction industry. Therefore, the overall poor economic performance of other industries during economic downturns may have additive effects on the steel and steel related industries, which causes them more likely than other industries to lobby for antidumping protection. In addition, a huge labor force enables the steel and steel related industries to stimulate the public protectionist sentiment more effectively in face of general economic deterioration, which, in turn, increase its chances of getting antidumping protection. Together with their exclusive political advantage, these characteristics give extra motivations for the steel and steel related industries to file antidumping petition during economic downturns. Our estimation results indicate that industries are generally similar in their decisions to lobby for antidumping protection.

As mentioned previously, we intend to test whether the determinants of industries' filing decisions accord well with the factors involved in the ITC's injury determinations. Consistency between these two would indicate that industries anticipate outcomes. In the next section we apply the probit model to estimate the ITC's decision-making behavior, with the primary goal of estimating the effect of macroeconomic pressures on the ITC's material injury determinations.

4.3.1 Modeling the ITC Decision Making

The ITC makes the final determination for material injury investigation, based on specific information about the petitioning industry, such as capacity utilization, import-penetration ratio and changes in the volume of imports and exports, etc. If the ITC concludes that these measures exceed a certain level, an affirmative determination is

granted and antidumping duties levied. Otherwise, a negative determination is obtained terminating the petition. In other words, the following model is estimated:

$$Z_i = \beta' X_i + \varepsilon_i \quad (5)$$

Where Z_i is the unobservable decision standard that is a function of the independent variables contained in matrix X_i . The matrix X_i contains the attributes of antidumping case i . β 's are coefficient parameters. The subscript i indicates the i^{th} antidumping case in our data sample. Since Z_i measures the unobservable decision standard used by the ITC, the following model is used:

$$\begin{aligned} y_i &= 1 & \text{if } Z_i > 0 \\ y_i &= 0 & \text{if } Z_i \leq 0 \end{aligned} \quad (6)$$

The ITC makes a binary choice of whether or not to grant protection to the petitioners. Such scenario fits well into a simple probit model. Y_i measures the ITC's final decision on the material injury investigation, with value 1 assigned to "affirmative determination" and 0 assigned to "negative determination". We can interpret equation (6) as an estimate of the conditional probability that ITC will grant an affirmative decision, given the attributes of a specific antidumping case i .

The matrix X_i contains exogenous variables that affect ITC's decision:

$$X_i = [\text{CYCLE}_i, \text{CAP}_i, \text{IMPR}_i, \text{DEFICIT}_i, \text{SIZE}_i, \text{CUMUL}_i, \text{JAPAN}_i, \text{DEVG}_i, \\ \text{CAP}_i * \text{CYCLE}_i, \text{IMPR}_i * \text{CYCLE}_i, \text{DEFICIT}_i * \text{CYCLE}_i, \text{SIZE}_i * \text{CYCLE}_i]$$

The economic variables are CYCLE, CAP, IMPR, and DEFICIT as defined previously. Also included are variables such as SIZE, a proxy for the political power of the

petitioning industry; CUMUL, a year dummy for 1984 onwards selected as a control for the possible effect of “mandatory cumulating” amendment enacted in 1984; a country dummy, JAPAN, to estimate whether imports from Japan are more likely to be subject to antidumping duties; and DEVG, a country dummy to distinguish developing countries and developed countries. ε_i is a well-behaved error term.

The central issue of our study is whether business cycles are important to the ITC’s material injury determinations. Previous studies have used GNP, the national unemployment rate and the national trade deficit as proxies for macroeconomic conditions. Our CYCLE, however, has several advantages over these measures. First, it captures the general economic trend, while allowing for minor fluctuations in such economic indicators as GNP and the trade deficit. For example, GNP varies from year to year as a result of changes in the natural environment, important international events or fluctuations in major raw material prices, such as oil. Just as a temporary decrease in temperature would not reverse the warming up trend in spring, a minor fluctuation in GNP would not vary the trend of an economic upturn or downturn. Therefore, the investigation of relation between CYCLE and the ITC’s injury decision provides a clearer picture of whether and how the ITC responds to macroeconomic trends.

Second, the lag between policy response and change in the economic condition is very likely to delay the ITC’s response to general economic changes. In addition, since each individual commissioner can choose their own investigation criteria (Kaplan, 1991), they may not interpret the change in a specific economic indicator in the same way. The differentiated responses of individual commissioners may collectively delay the ITC’s

response to economic shocks. The business cycle measure, however, is based on the behavior of several economic indicators over time.

Thirdly, using variables such as national trade deficit to measure general economic pressure may even turn out to be misleading. For example, the increase in the trade deficit may stem from faster increase in the domestic demand relative to that in the production capacity of the domestic industry. In this case, the domestic industries are likely to operate at full capacity in a booming economy. Therefore the estimation results could be misleading, if the increased trade deficit is interpreted as deterioration of the domestic economy increasing protectionist pressure on the ITC. In sum, the use of business cycle avoids measurement problems and generates a more accurate estimation of the relationship between macroeconomic pressures and the ITC's injury determination.

We hypothesize that the slowdown in the economy would increase trade protectionist pressures. If the ITC bases its estimation of material injury purely on statutory requirements, then macroeconomic condition should not exert any pressure on the ITC's decision making procedure, hence the business cycles should have no effect on the ITC's decisions. However, since the inverse relationship between macroeconomic condition and the ITC's intent to grant trade protection has been widely documented in previous studies (Hansen and Prusa, 1996), we expect the ITC to be more likely to grant protection during economic downturns.

Since the ITC is directed by antidumping legislation to analyze the economic and financial data of each antidumping case, and to determine whether imports are causing material injury to the petitioning industry, we expect variables measuring the

performance of the petitioning industry to have significant impacts on the ITC's decisions. Decreases in domestic industries' capacity utilization rates imply idled production facilities or reduced working hours, which hurts the domestic industries' profitability given fixed production costs. Therefore, we hypothesize that the ITC is more likely to generate affirmative determination the lower is CAP. Increases in import penetration and trade deficit often result in decreased domestic production or costly adjustments in domestic production composition, which causes injury to domestic industries. IMPR and DEFICIT are then expected to have positive and negative coefficient respectively.

We also hypothesize that industry bias occurs in the ITC's injury decision. In other words, outcomes of the ITC's final decision are subject to pressures from the petitioning industry.¹⁸ The size of the industry is commonly used as a proxy to measure the industry's ability to exert political pressure on the ITC, and thus affect the outcome.¹⁹ To capture the size of an industry, previous studies use "employment" and "coverage" (Hansen, 1990 and Moore, 1992). "Coverage" refers to the number of states in which the petitioning industry operates. In the present paper, we use the value of industry shipments to account for the size of the petitioning industry. It measures an industry's economic importance in serving politician interests, which implies its political power. Therefore, the value of industry shipments is, in our belief, more desirable. For example, a labor-

¹⁸ According to the economic theory of regulation, interest groups can influence the outcome of the regulatory process by providing financial support to politicians (Stigler, 1971).

¹⁹ Alternative measures of an industry's lobbying power include the industry's budget spending on legal matters and its financial contribution to political campaigns.

intensive industry with huge employment may not guarantee higher economic contribution than that of a capital-intensive industry with relatively smaller employment.

The literature on the impact of the industry's size on affecting its ability to influence the regulators' decision splits into two opposite branches. According to Olson (1965), groups that are smaller relative to any opposing group are more effective at organizing and taking actions. Since the potential payoff of antidumping protection will spill over the petitioning industry, free rider problem could discourage firms cooperate effectively in large industries. A counter argument is proposed by Becker (1983), who argues that larger industries have substantial resources, and thus, are more powerful and effective at influencing bureaucratic agents. For example, large industries are more likely to have substantial intellectual resources to make informative decisions on the timing of filings to set up the case more appealing to commissioners. Another possibility is that imposed antidumping duties may have effects on income distribution among domestic residents. Large industries are, therefore, more capable of exerting pressure on vote-seeking politicians who tend to cater to the interests of labor force in large industries. Given the above arguments, expected sign for SIZE could either be positive or negative.

CUMUL is expected to have a positive sign. According to Hansen (1997) and Horlick and Oliver (1989), antidumping law has been constantly revised to increase the domestic industries' chances in filing successful petition. In 1974, for example, the definition of dumping was broadened to include sales below production cost. Ensuing significant changes to antidumping law was set forth in the Trade Agreement Act of 1979 manifested continuous lobbying efforts of domestic industry to make the law more likely

to result in duties. The use of antidumping protection exploded since amendments such as the approval of “best information available” and shortened time limits on case investigation. The “mandatory cumulating” amendment enacted in 1984 is believed to be a significant step forward in making antidumping law more satisfactory to domestic industries. Without cumulation, imports are evaluated on country-by-country basis in the injury investigation. The cumulation provision, however, requires the ITC to assess the combined effects of imports from multiple sources, when such imports are subjected to antidumping investigation simultaneously. Consequently, imports covering low or insignificant market share are subject to antidumping duties, once the integrated effects are tested to be injurious. Prusa (1996) documents a 50 percent increase in antidumping cases filed against multiple countries after 1984. Hansen and Prusa (1996) find that the “cumulation provision” increased the probability of an affirmative injury determination by 20 to 30 percent. Hence, we expect the ITC to be more likely to grant affirmative injury decision in cases filed on and after 1984.

Finally, we assume that filing antidumping cases against Japanese exporters and those from developing countries increase the odds of the ITC’s affirmative material injury decision. Japanese producers have successfully built up their market share in the U.S.. Increasing net imports from Japan pose great threats to many American industries, most strikingly, the auto industry.²⁰ Consequently, a significant increase in the number of antidumping cases filed against Japanese exporters is observed as a consequence of rising protectionist sentiment. For example, 52 out of 415 antidumping cases were filed against

²⁰ See Figure 1 for suggestive evidence of cross-subsidization by Japanese automakers.

Japanese exporters during 1980-1988, making Japan the most frequently named country under the United States antidumping actions. This resulted in substantial trade contraction of Japanese export to the U.S. with an estimated loss of \$7.6 billion (Prusa, 1996). Alternatively, antidumping could have been increasingly used as a de facto policy to induce FDI from Japanese industries, which promotes domestic output and employment. So we expect the ITC to be more protective in dealing with cases filed against Japanese exporters.

DEVG is expected to have a positive sign. Developing countries' exports to the U.S. are often labor-intensive and constitute a leading source of U.S. trade deficit. It has been widely documented that antidumping legislation appear to be notably arbitrary in its treatment of imports from non-market economy, which more often than not characterize the markets in developing countries (Boltuck and Litan, 1991). In addition, it is often the case that developing countries' market is not well directed by the price mechanism but rather by governmental regulations. Hence, U.S. antidumping regulation deems information on price and production cost provided by developing countries as not representative of actual prices and costs. Therefore, a surrogate country is chosen to construct the fair value under the condition that the two countries have comparable level of economic development. However, the difference between two countries' production environment, quality control, input cost and consumption pattern are easily ignored under such ambiguous condition. Therefore, it created an artificial way to construct a normal fair value (the so called "constructed -value" method), and made it easier for the ITC to blame the dumped imports for any deterioration in the petitioning industry.

The inclusion of the interaction terms allows us to estimate whether changes in CAP, IMPR, DEFICIT and SIZE exert the same magnitude of effects on the ITC's final decision during economic upturns and downturns. In other words, the coefficient estimates for CAP, IMPR, DEFICT and SIZE may vary with the business cycles. For example, a unit increase in IMPR might have smaller adverse effect on domestic industries during economic upturns. Thus, for a similar increase in IMPR, a case might be more likely to result in an affirmative decision during economic downturns.

Descriptive statistics of dependent variables and independent variables are presented in Appendix Table 5. In the next section, we report the regression results and the corresponding interpretations. Definition and expected signs for each of the independent variables are summarized in Table 4.

Table 4. Predicted Effects of The Independent Variables — Injury Determination

Variable Name	Definition	Expected Sign
<i>Macroeconomic variable</i> CYCLE	<ul style="list-style-type: none"> Business cycle, a dummy variable <i>CYCLE = 1 if decision is made during economic upturns</i> <i>CYCLE = 0 if decision is made during economic downturns</i> (Peaks and troughs are tabulated as upturns and downturns respectively) 	Negative
<i>Industry-level economic variable</i> CAP	<ul style="list-style-type: none"> Industry capacity utilization ratio. Defined as percent of the establishments' maximum level of production capacity CAP_{t-1}* 	Negative
IMPR	<ul style="list-style-type: none"> Import-penetration ratio. Calculated as $\frac{import_{t-1}}{output_{t-1} + import_{t-1}}$ 	Positive
DEFICIT	<ul style="list-style-type: none"> Trade deficit of the industry under investigation. Calculated as <i>Value of Exports_{t-1} – Value of Imports_{t-1}</i> (in million dollars) 	Negative
<i>Other variable</i> SIZE	<ul style="list-style-type: none"> The size of petitioning industry, measured by the value of industry shipments (in million dollars) 	Positive/ Negative
CUMUL	<ul style="list-style-type: none"> Dummy variable to estimate the effect of 1984 “mandatory cumulating” amendment to the antidumping law <i>CUMUL = 1, for 1984 and thereafter</i> <i>CUMUL = 0, otherwise</i> 	Positive
JAPAN	<ul style="list-style-type: none"> Country dummy variable for Japan <i>JAPAN = 1, if the case is filed against Japanese industry</i> <i>JAPAN = 0, otherwise</i> 	Positive

Variable Name	Definition	Expected Sign
DEVG	<ul style="list-style-type: none"> Country dummy variable for developing countries <p style="text-align: center;"><i>DEVG = 1, if the case is filed against developing countries</i> <i>DEVG = 0, otherwise</i></p>	Positive

* t: The year ITC determination is generated

4.3.2 Analysis of Regression Results

Columns two and four of Table 5 present the coefficient estimates for the probit model. We estimate both constrained and unconstrained models. In the unconstrained model, we include the interaction terms specified in matrix X_i . The model without the interaction terms is nested in the unconstrained model, by imposing constraint $\beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = 0$. To test the imposed constraints, we apply the likelihood ratio (LR) test.²¹ From Table 5, we see that the calculated likelihood ratio chi-square does not allow us to reject the null hypothesis of zero coefficients of the interaction terms ($H_0: \beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = 0$) at the 5 percent significance level. Therefore, in the present study, the restrictive model is preferred in estimating the outcomes of the ITC's final decision.

²¹ The formula is $G^2(M_c | M_u) = 2\ln L(M_u) - 2\ln L(M_c)$. Refer to Long (1997) for a detailed discussion.

Table 5. Probit Estimation on The ITC's Final Decision^{a/}

Variable	Unconstrained Model		Constrained Model	
	Coefficient	Marginal effect at the mean	Coefficient	Marginal effect at the mean
Constant	-11.997 (0.2948)	-3.037	1.573** (0.0067)	0.568
CYCLE	12.874 (0.2621)	3.259	-0.899** (0.0121)	-0.325
CAP	0.145 (0.2868)	0.037	-0.105 (0.1090)	-0.004
IMPR	0.218 (0.3841)	0.055	0.007 (0.2928)	0.003
DEFICIT	-0.004 (0.1452)	-0.001	0.843** (0.0003)	0.305E-05
SIZE	0.486E-03 (0.1148)	0.123E-03	0.142** (0.0053)	0.512E-05
CUMUL	0.033 (0.8987)	0.008	0.143 (0.5621)	0.051
JAPAN	0.418* (0.0518)	0.106	0.444** (0.0361)	0.160
DEVG	0.251* (0.0759)	0.064	0.260* (0.0635)	0.094
CAP*CYCLE	-0.156 (0.2503)	-0.040	-	-
IMPR*CYCLE	-0.212 (0.3966)	-0.054	-	-
DEFICIT*CYCLE	0.445E-02 (0.1374)	0.001	-	-
SIZE*CYCLE	-0.471 (0.1259)	-0.119E-03	-	-
Number of obs.	421		421	
Log likelihood	-250.1038		-254.3703	
Chi-squared	41.9752 (<i>df</i> = 12)		33.4422 (<i>df</i> = 8)	
LR test	8.533 ^b			

Notes: a/ The numbers in parentheses are p-values.

b/ The critical value for χ^2 (4) distribution at 5 percent significance level is 9.49.

* Indicates statistical significance at the 10% level with two-tail test.

** Indicates statistical significance at the 5% level with two-tail test.

As shown in Table 5, CYCLE, SIZE and JAPAN are statistically significant at the 5 percent significance level with the expected signs. DEFICIT is statistically significant

at the 5 percent significance level but with an unexpected positive sign. The country dummy, DEVG has the expected positive sign and is statistically significant at 10 percent significance level. The other three variables, CAP, IMPR and CUMUL are not significant at the 10 percent significance level.

The estimation results indicate that business cycles are negatively related with the ITC's likelihood of affirmative injury decision, confirming the pattern in Figure 1. It suggests that the ITC is more likely to give an affirmative determination during economic downturns, which questions ITC's independence from macroeconomic pressures. Our empirical finding is to the contrary of that concluded in Takacs (1981), where the author claims that the ITC does not appear to respond to changes in domestic economic well-being in granting trade protection. Our results, on the other hand, confirm findings of Leidy (1997) and Knetter and Prusa (2000).

The only industry-level economic variable estimated to be statistically significant in affecting the ITC's final decision is DEFICIT. However, the estimated positive sign is opposite to our initial expectations, meaning industries are more likely to get antidumping protection from the ITC when industry exports increase relative to imports. Specifically, the estimated marginal effect shows that one unit increase in the trade surplus from the mean value increases the probability of getting the ITC's affirmative decision by 0.0003 percent. One possible count implicit in such finding is the protectionist nature of the ITC's practice. As indicated above, domestic industries file antidumping petitions strategically. The corresponding increase in the ITC's likelihood of granting affirmative injury decisions suggest its vulnerability to protectionist pressures

from the domestic industry. For example, an increase in the demand for domestic products indicates improved international competitiveness, which leads to production expansion and new job opportunities. The well-being of domestic industries is, thus, economically and politically beneficial. As a response, the ITC is less likely to turndown the domestic petitioners and upset the trade balance. Therefore, antidumping protection helps the domestic industry to secure its home market while expanding foreign market shares. As mentioned previously, both CAP and IMP are not statistically significant at the 10 percent significance level. This result is consistent with Herander and Schwartz (1984). But it contradicts those found by Baldwin (1985), who concludes that the ITC make decisions based on a strict interpretation of the antidumping statute. The relative insignificance of these variables may reflect the great latitude that individual ITC commissioners have in making their own determinations. Individual commissioners' interpretations of the vaguely defined "material injury" in the antidumping legislation may differ. According to Kaplan (1991), commissioners can choose any one (or a combination) of those five analysis approaches in making their injury decisions. Regressions are run by individual commissioners to determine the variables that best explain the statutory criteria (Baldwin and Steagall, 1994). The observed discretion in the ITC's decision making procedures may also account for the importance of the non-economic variables in affecting its final injury determinations.

All the non-economic variables, except for CUMUL, appear to be significant factors in explaining the outcomes of the ITC's final decision. The insignificance of CUMUL gives little support to Hansen and Prusa's (1996) conclusion that the

“cumulation provision” increased the probability of an affirmative injury determination. The significant estimate of the positive coefficient for SIZE indicates that the ITC is vulnerable to political pressures from petitioning industries, challenging the impartialness of the ITC’s practice set forth in the antidumping legislation. Specifically, we found that a unit increase in the petitioning industry’s size from the sample mean increases the probability of getting protection from the ITC by 0.0005 percent. It is in accord with the notion that the larger industry is more powerful in lobbying for trade protection, supporting Becker’s (1983) theory. Such result is in consistent with Hansen (1990) and Hansen and Prusa (1997) and Baldwin and Steagall (1994), where the authors challenge the apolitical nature of the ITC. The primary metal products industry, for example, is important to the national interest and has been the largest petitioner of antidumping cases. It has a SIZE of 32,317.909 (value of industrial shipments measured in million dollars) compared with our sample mean at 21,055.645. Consistently, their successful filing rate of antidumping petition is over 70 percent compared with 65 percent for all sampled cases. Thus, our results give further empirical support to the conclusion that industries with greater political power are more likely to get antidumping protection from the ITC.

In addition, country-bias is estimated to play an important role in the ITC’s final determination. Our results indicate that petitions filed against Japanese exporters or against those in developing counties are more likely to be successful. Specifically, 75.81 percent of the cases filed against Japanese exporters are successful, with 68.72 percent for the cases filed against developing country exporters, while the successful rate of our entire sample is 65.56 percent.

Taken together, our results suggest that the ITC is vulnerable to both general economic pressures and industry specific pressures. Cases filed against Japanese or developing country exporters stand strikingly better chance of getting antidumping protection. The insignificant interactive terms suggest that the effects of estimated independent variables on ITC's final injury decisions do not differ significantly over business cycles.

4.3.3. An Issue with Steel and Steel Related Industries

Empirical studies have consistently documented the privilege of steel and steel related industries in getting antidumping protection. Moore (1992) and Sabry (2000) attribute part of these industries' success to the learning-by-doing effect. Blonigen and Prusa (2001) find that steel cases are about 30 percent more likely to win than non-steel cases, controlling for industry size, changes in profit and changes in trade volume, etc. Therefore, there is reason for us to estimate whether the inclusion of steel and steel related cases would affect our conclusion on the determinants of the ITC's injury decision.

Dropping steel and steel related cases, we apply the same probit model to estimate the ITC's injury determinations over non-steel antidumping cases. Regression results are reported in Table 6.

Table 6. Probit Estimation on The ITC's Final Decision—non-steel cases

Variable	Coefficient	Marginal effect at the mean
Constant	1.748** (0.0264)	0.633
CYCLE	-1.073** (0.0105)	-0.389
CAP	-0.150 (0.1066)	-0.005
IMPR	-0.1011 (0.3476)	-0.004
DEFICIT	0.980** (0.0135)	0.355E-04
SIZE	0.718E-05 (0.2801)	0.260E-05
CUMUL	0.702** (0.0407)	0.254
JAPAN	0.764** (0.0055)	0.277
DEVG	0.422* (0.0554)	0.153
Number of observations	204	
Log likelihood function	-114.3345	
Chi-squared	37.41519 (<i>df</i> = 8)	

Notes: a/ The numbers in parentheses are p-values.

* Indicates statistical significance at the 10% level with two-tail test.

** Indicates statistical significance at the 5% level with two-tail test.

As indicated in Table 6, CYCLE remains negatively related with the ITC's likelihood of making affirmative injury determination at the 5 percent significance level. Also, the ITC is more likely to grant antidumping protection when the industrial trade deficit is smaller, and when the cases are filed against Japan or developing countries. Industry size effect become insignificant in the non-steel cases, while the positive "cumulation" effect become significant at 5 percent significance level. Note that increases in estimated marginal effects of JAPAN, DEVG and CUMUL accord well with the empirical findings in Blonigen and Prusa (2001), where the authors conclude that the

apparent bias against certain trading partners questioned the apolitical nature of the ITC's practice. Likewise, Hansen and Prusa (1996, 1997) find that antidumping protection is constantly biased toward cases against non-market economies. The change in the significance level of CUMUL indicates that since steel and steel related industry's petition has already been systematically favored by the ITC anyway, amendment to the antidumping law does not have apparent effects on the outcomes of steel and steel related cases. The significantly positive effect of CUMUL in the non-steel cases, however, suggests that the "mandatory cumulation" amendment in 1984 dramatically raised the probability of affirmative injury decisions. Antidumping law, as concluded in previous studies, has evolved as a protectionist tool. In the next section, we summarize our findings and suggest possible expansions.

5. Conclusions and Policy implications

Using panel poisson regression we have tested the determinants of U.S. industries' antidumping filing decisions. Our results suggest a countercyclical antidumping filing pattern. However, such countercyclical nature disappears when we restrict our sample to non-steel industries. We believe the reason is that steel and steel related industries' well-being is more sensitive to macroeconomic conditions, hence their filing behavior is more likely to vary with business cycles. The results for other independent variables are consistent with or without steel related cases. Industries are more likely to lobby for antidumping protection in face of lower capacity utilization ratio

and smaller trade deficit. The passage of “cumulation amendment” in 1984 significantly stimulated antidumping petitions in the U.S..

As for the determinants of the ITC’s material injury decision, our estimation results from the probit model indicate that the ITC’s decisions are not strictly based on the examination of case-specific economic variables. Instead, the ITC’s injury determinations are subject to general economic and industries’ lobbying pressures. Specifically, the ITC is more likely to grant antidumping protection during economic downturns, while case-specific variables, such as CAP and IMPR, do not appear to be significant in the ITC’s determinations. In contrast, variables such as SIZE and country dummies perform strikingly well. Larger industries are more likely to file successful antidumping petitions. But such size effect disappears when steel and steel related cases are dropped. Cases against Japanese and developing country exporters stand better chances of getting antidumping protection. Finally, the “mandatory cumulation” amendment significantly raises the probability of getting an affirmative decision in non-steel cases. In summary, our findings cast doubt on the impartialness and apolitical nature of the ITC.

Taking the empirical findings together, we find that industries base their filing decisions not only on economic necessities but also on their anticipated chances of getting the ITC’s affirmative injury determination. In other words, industries’ strategic filing behavior plays an important role in explaining the observed antidumping filing pattern. Particularly, domestic industries’ filing decisions appear to be based on anticipated outcomes.

Many questions however remain unanswered. For example, we have not estimated the effects of recent regional trade agreements such as NAFTA. In addition, with the primary focus on petitioning industries, there has been little study on how other sectors of the domestic economy react to the upsurge of antidumping protection and whether their reactions have effects on the petitioners filing patterns as well as the ITC's decisions. Many antidumping cases involved imports that are important inputs to other industries. For example, antidumping duties imposed on steel products will have direct impact on the auto industry's input prices. Will auto industry lobby against such trade protection? How does the objection affect the ITC's determination? Will the surge in intra-industry trade pattern affect antidumping filing behavior? For example, it may be beneficial for the U.S. to reduce trade barriers on importing lower quality products from developing countries in exchange for more U.S. exports of higher quality products into foreign markets. These are only some of the questions that require further research. In the meantime, how well the antidumping policy will coexist with WTO under the trend of trade liberalization will definitely be on the agenda of multilateral trade negotiations.

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Table 1. Evolution of U.S. Antidumping Law

Act and Date	Major Characteristics & Amendments
Sherman Act, 1890	<ul style="list-style-type: none"> ▪ Antitrust law to regulate: ▪ Conspiracy or combination ▪ Restraint, monopolization, or attempt to monopolize interstate or foreign commerce ▪ Criminal statute, strictly construed ▪ Fine, imprisonment (through court action); triple damages
Antidumping Act, 1916	<ul style="list-style-type: none"> ▪ Antidumping law ▪ To restrain importing below actual market value or wholesale value ▪ Intent to restrain competition or injury to a U.S. industry ▪ Criminal statute, strictly construed ▪ Fine, imprisonment (through court action); triple damage
Antidumping Act, 1921	<ul style="list-style-type: none"> ▪ Antidumping law ▪ To restrain importing below fair value ▪ To restrain injury to a U.S. industry (Likelihood of injury is acceptable for complaint) ▪ Administrative determination by the secretary of treasury rather than by court action ▪ Special duty based on dumping margins, equal to the difference between the fair value and import price
Section 316, Fordney-McCumber Tariff Act, 1922	<ul style="list-style-type: none"> ▪ Refine both the definition of dumping and the concept of injury ▪ Regulate Unfair method of competition and unfair acts in importation whose tendency is to destroy or substantially injure ▪ Tariff Commission becomes the agency that makes injury determination and courts are limited to review only questions of law ▪ Additional duty to offset the act or method
Tariff Act, 1930	<ul style="list-style-type: none"> ▪ Streamlined the collection of antidumping duties once the Treasury Department had levied on dumped goods

Trade Act of 1974	<ul style="list-style-type: none"> Amendments in the administrative determination of less than fair value not only ensure that products are sold at the price no less home-market price but also assure that the price is not below cost
Trade Agreements Act of 1979	<ul style="list-style-type: none"> Implemented the Tokyo Round Agreement, (Antidumping Code of the GATT included) Repealed the 1921 Act Amended Tariff Act of 1930 to comply with the new GATT code Procedure to apply antidumping is revised and the administrative jurisdiction is switched from Treasury to Commerce
Trade and Tariff Act of 1984	<ul style="list-style-type: none"> Changes in calculating fair market price, comparing averages in home market with the price in U.S. market
Omnibus Trade and Competitiveness Act of 1988	<ul style="list-style-type: none"> Widened the allowable products subject to antidumping order (i.e. parts, slightly altered products) Allow U.S. trade representative to request that a foreign government take action against third-country dumping if such is found to be injurious to the U.S. industry
The Uruguay Round Agreement Act of 1994	<ul style="list-style-type: none"> Amended U.S. antidumping law to comply with revised Article VI of the General Agreement on Tariffs and Trade Amended LTFV determinations and enacted fully detailed international system to control dumping. Provide guidelines to Sunset, evaluate Start-up costs, Anticircumvention, Standing, Dispute, Duty as Cost or Duty Absorption, Below-cost sale, Price Averaging and De Minimis Margins etc.

Source: U.S. Tariff Commission, 1919; Finger, 1993; Mastel, 1998

Table 2. Summary of Selected Studies of U.S. Antidumping Filing Decisions and the ITC's Decisions Determinants of the United States

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Takacs (1981)	Escape clause cases between 1962 and 1979 in the U.S.	OLS Dependent variables: • <i>Number of escape clause cases filed annually</i>	<ul style="list-style-type: none"> • Domestic GNP level (-) • Domestic unemployment rate (+) • Capacity utilization ratio (-) • U.S. Trade balance (-) • Import penetration ratio (+) • Lagged success rate (+) • 1962 Act Dummy (-) • 1974 Act Dummy (+)
Finger (1981)	Cross section data of all the CVD and AD cases from Jan. 1975- Dec. 1979 3-digit SIC level.	OLS Dependent variables: LTFV complaints incidence = • <i>Percent of imports covered by all cases</i>	<ul style="list-style-type: none"> • Trade balance (-) • Import penetration ratio (+) • 1962 Act Dummy (-) • 1974 Act Dummy (+) • Import penetration ratio (+) • Physical capital stock (+) • Employment level (-)

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Finger (1981)	Cross section data of all the CVD and AD cases from Jan. 1975- Dec. 1979 3-digit SIC level.	OLS Dependent variables: LTFV complaints incidence = • <i>Percent of imports covered by affirmative cases</i>	<ul style="list-style-type: none"> • Import penetration ratio (+) • Value of domestic shipments (+) • Product differentiation (+) • Labor intensity (-) • Physical capital intensity (-) • Human capital intensity (+)
Herander and Schwartz (1984)	Data of U.S. LTFV cases filed between 1976-1981 are collected at 4-digit SIC level.	OLS Dependent variables: • <i>LOMC = Index number of filing incidence constructed on basis of the percentage of total imports of domestic industry that have been subject to a LTFV investigation</i>	<p>Determinants of filing:</p> <ul style="list-style-type: none"> • Import penetration ratio (+) • Ratio of wage to value added (+) • Total value of capital stock in domestic industry (+) • industrial unionization (+) • Dummy for four subperiods (+) <p>Determinants of outcome:</p> <ul style="list-style-type: none"> • Num. of firms with industry (-) • % Change of domestic industry employment (-) • (Profits/sales) (-) • Skill labor/Total employment (-) • Weighted average of dumping margins of all exporters (+) • Dummy for four subperiods (+) <p>Determinants of ITC's decision; Logit model</p> <ul style="list-style-type: none"> • <i>I = affirmative determination</i>

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Coughlin, Joseph and Khalifah (1988)	Escape clause cases between 1948-1984 are collected at firm level	poisson Regression Dependent variable: <ul style="list-style-type: none"> • <i>Number of escape clause petitions by a firm</i> 	<ul style="list-style-type: none"> • Firm level capacity utilization ratio (-) • Firm level trade balance (-) • Dummy for Trade Act of 1974 (+)
Feinberg and Hirsch (1989)	Antidumping and countervailing duty cases filed in the U.S. between 1980 and 1986 are collected at 3-digit SIC industry level.	Tobit maximum likelihood estimation Dependent variable: <ul style="list-style-type: none"> • <i>Case filing propensity per thousand companies</i> 	<ul style="list-style-type: none"> • Industrial capital intensity (+) • Log of the number of companies in an industry (-) • Industry size—log of employment (-) • Chang in employment (-) • Import penetration ratio (+)

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Hansen (1990)	All ITC cases considered under escape clause, antidumping, and countervailing duty are collected at 4-digit SIC industry level.	<p>Nested Logit Model</p> <p>Dependent variable: <i>Outcome of the ITC decision</i> 1974-1985</p> <ul style="list-style-type: none"> • (1 = <i>Affirmative decision</i>) 	<ul style="list-style-type: none"> • Industry size—Industry employment (+) • Location of industry in a district whose senate is a Democrat and a member of trade subcommittee of Ways and Means. (+) • Location of industry in a district whose representative is the chair of Ways and Means. (+) • U.S. trade deficit (+)
		<p><i>Filing decision</i> 1975-1984</p> <ul style="list-style-type: none"> • (1 = <i>at least one petition is filed for any industry in a given year</i>) 	<ul style="list-style-type: none"> • Percentage change in industry employment (-) • Percentage change in domestic industry market share (-) • Tariff rate (-)
Moore (1992)	Antidumping cases determined by ITC between 1980 and 1986 are collected at four or five-digit SIC industry level.	<p>probit model</p> <p>Dependent variable:</p> <ul style="list-style-type: none"> • 1 = <i>Commissioner i's vote on the petition of industry j is affirmative</i> 	<ul style="list-style-type: none"> • Change in industry production (-) • Change in volume of dumped imports (+) • Dummy variable indicating whether the decision is at the preliminary level or final stage 1 = final stage (-)

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Moore (1992)	Antidumping cases determined by ITC between 1980 and 1986 are collected at four or five-digit SIC industry level.	probit model Dependent variable: <ul style="list-style-type: none"> • $I = \text{Commissioner } i\text{'s vote on the petition of industry } j \text{ is affirmative}$ 	<ul style="list-style-type: none"> • Change in volume of all imports (+) • Nominal wage level (-) • Case against less-developed country (+) • Number of workers in the industry (-) • 1=petitioning industry located in a senate trade subcommittee
Devault (1993)	Antidumping and antisubsidy cases with final ITC decision between March 1985 and June 1992.	Logit model is applied to estimate the bifurcated approach used by individual commissioners. Dependent variable: <ul style="list-style-type: none"> • Stage I: $I = \text{affirmative vote of an individual commissioner on material injury}$ • Stage II: $I = \text{affirmative vote of an individual commissioner on causation.}$ 	Material injury determinants: <ul style="list-style-type: none"> • Domestic industry profit rate (-) • Domestic industry market share (-) • One year percentage change in its domestic market share (-) • One year percentage change in domestic production (-) • Value of domestic shipments of the industry in most recent year (+) Causation determinants: <ul style="list-style-type: none"> • Dumping or subsidy margin (+) • Market share of unfair imports (+)

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Baldwin and Steagall (1994)	Cross-sectional case level data of safe guard cases determined between 1974 and 1988; antidumping and countervailing cases determined between 1980 and 1990	probit model <ul style="list-style-type: none"> • $l = \text{affirmative ITC decision}$ 	<ul style="list-style-type: none"> • Ratio of imports in the industry to the consumption of the product (+) • The percentage change in capacity over the most recent year (-) • The direction of the two-year percentage change in the quantity of dumped or subsidized imports from all sources, 1=negative change (-) • Whether the product under investigation have been subject to previous investigation of the same type (+)
Staiger and Wolak (1994)	Panel data of antidumping cases filed between 1980 and 1985 are collected at 4-digit SIC industry level	Negative binominal model Dependent variable: <ul style="list-style-type: none"> • <i>Number of antidumping cases filed by industry</i> 	<ul style="list-style-type: none"> • Import penetration ratio (+) • Industry capacity utilization ratio (-) • Industry employment (+) • Share of primary factor payment in total costs (-)

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Hansen and Prusa (1996)	Antidumping and countervailing cases filed between 1980 and 1988 are collected at industry level.	probit model <ul style="list-style-type: none"> • $I = \text{affirmative ITC decision}$ 	<ul style="list-style-type: none"> • Number of representative on Ways and Means Districts (+) • Import market share (+) • European dummy (-) • Less-than-fair-value duty (+) • Non-market dummy (+) • Steel industry dummy (+) • Cumulation dummy (+)
Hansen and Prusa (1997)	Cross-section case level data of antidumping and countervailing duty cases filed between 1980 and 1988; Limiting cases to manufacturing industry only; Dropping cases rejected by the Department of Commerce; Dropping countervailing duty cases against industry located in countries that have not signed GATT subsidy code.	probit model Dependent variable: <ul style="list-style-type: none"> • $I = \text{affirmative ITC decision}$ 	<ul style="list-style-type: none"> • PAC contributions (+) • Named country import market share (+) • Steel industry dummy, 1=steel industry (+) • Percentage change industry capacity utilization (-) • Non-market economy dummy (+) • Number of representative in Ways and Means Districts (+)

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Leidy (1997)	Annual observation of the U.S. antidumping and countervailing duty cases between 1986 and 1995.	OLS regression Dependent variables: • <i>Number of antidumping and countervailing duty cases</i> & • <i>Number of successful cases</i>	<ul style="list-style-type: none"> • Civilian unemployment rate (+) • Rate of industrial capacity utilization (-) • Number of petitions in the previous year (-) • Real effective exchange rate of U.S. dollar (+)
Knetter and Prusa (2000)	Antidumping cases filed between 1980 and 1998 are collected at country level for four countries.	Poisson panel model and Negative binominal panel model Dependent variable: • <i>Number of antidumping case filed</i>	<ul style="list-style-type: none"> • Real exchange rates (+) • Domestic real GDP growth (-)

Table 2. (cont.)

Study	Data/Time period	Estimation Method	Variables with statistical significant coefficients and corresponding signs
Sabry (2000)	Data of U.S. antidumping cases filed between 1986 and 1992 are collected at the 4-digit SIC level	Univariate probit model and bivariate probit model with sample selection Dependent variables: <ul style="list-style-type: none"> • $I = \text{industry decision to file}$ 	Filing behavior: <ul style="list-style-type: none"> • Import penetration ratio (+) • Capacity utilization (-) • Interaction term: capacity utilization multiplied by dummy for less concentrated industry (+) • Industry concentration ratio (+)
		<ul style="list-style-type: none"> • $I = \text{Affirmative ITC decision}$ 	Outcome of the petition: <ul style="list-style-type: none"> • Import penetration ratio (+) • Dumping margin estimated by Department of Commerce (+) • Percentage change in consumption demand (-)

Table 3. Number of Antidumping Cases Filed Between 1980 and 1995

2-digit SIC	1980-1987	1988-1995
20	13	5
22	7	12
23	7	6
25	2	-
26	2	9
27	2	-
28	36	58
29	1	-
30	5	13
31	19	-
32	2	5
33	178	128
34	33	39
35	17	58
36	18	11
37	11	8
38	-	13
39	4	7
Total	357	372

Table 4. Descriptive Statistics for Filing Behavior Estimation

Variable	Mean	Std. Dev	Minimum	Maximum
Filing Number	0.5363	3.0110	0	56
CYCLE	0.8402	0.2726	0.0833	1
CAP	73.4106	12.5565	24	99
IMPR	16.2769	12.6557	0.25	67
DEFICIT	-821.8608	4717.3760	-53713.6	38231.2
SIZE	11015.8500	20776.3000	242.4	229565.8
CUMUL	0.7674	0.4227	0	1

Table 5.
Descriptive Statistics Based on 421 Cases Reached the ITC's Final Decision^{a/}

Variable	Mean	Std. Dev	Minimum	Maximum
DECISION	0.653	0.476	0	1
CYCLE	0.931	0.254	0	1
CAP	77.943	11.229	41	97
IMPR	17.010	11.119	1	60
DEFICIT	-2462.175	5070.862	-51277.1	38231.2
SIZE	21055.645	20331.0924	298.2	14635.7
CUMUL	0.900	0.300	0	1
JAPAN	0.1425	0.350	0	1
DEVG	0.499	0.501	0	1
CAP*CYCLE	72.848	22.529	0	97
IMPR*CYCLE	16.059	11.485	0	60
DEFICIT*CYCLE	-2451.358	5039.714	-51277.1	38231.2
SIZE*CYCLE	20188.245	20499.766	0	146135.7

a/ Cases without missing variable

Correlation Coefficients

Variable	CYCLE	CAP	IMPR	DEFICIT	SIZE	CUMUL	JAPAN	DEVG
CYCLE	1.000	0.097	0.079	-0.124	0.113	0.379	-0.050	0.009
CAP	0.097	1.000	-0.002	0.050	0.167	0.265	-0.068	-0.027
IMPR	0.079	-0.002	1.000	-0.053	-0.170	0.120	-0.044	0.185
DEFICIT	-0.124	0.05	-0.053	1.000	-0.602	-0.043	0.011	0.040
SIZE	0.113	0.167	-0.17	-0.602	1.000	0.061	0.050	-0.091
CUMUL	0.379	0.265	0.12	-0.043	0.061	1.000	-0.091	0.079
JAPAN	-0.05	-0.068	-0.044	0.011	0.05	-0.091	1.000	-0.366
DEVG	0.009	-0.027	0.185	0.04	-0.091	0.079	-0.366	1.000

Table 6. Pooled Estimation Results From Poisson, NB, and ZIP Models ^{a/}

Variable	Poisson	NB	ZIP
Constant	-0.339 (0.217)	-1.317* (0.098)	1.320** (0.000)
CYCLE	-0.257 (0.189)	0.115 (0.815)	0.023 (0.903)
CAP	-0.591E-02* (0.071)	-0.006 (0.505)	-0.005 (0.106)
IMPR	-0.203E-03 (0.952)	0.007 (0.437)	-0.202E-03 (0.954)
DEFICIT	-0.457E-06 (0.927)	-0.119E-04 (0.699)	0.165E-04** (0.002)
SIZE	0.131E-04** (0.000)	0.364E-04** (0.000)	0.150E-04** (0.000)
CUMUL	0.205 (0.131)	0.413 (0.234)	0.100 (0.447)

Notes: a/ The numbers in parentheses are p-values.

* Indicates statistical significance at the 10% level with two-tail test.

** Indicates statistical significance at the 5% level with two-tail test.

Data Appendix

Y_i	The ITC's final injury determination on the i^{th} antidumping case. Source: 4-digit SIC level data are provided by Dr. Blonigen at http://darkwing.Uoregan.edu/~bruceb/Describel.html
Y_{it}	Annual number of antidumping cases filed by industry i in year t . Source: 4-digit SIC level data are provided by Dr. Blonigen at http://darkwing.Uoregan.edu/~bruceb/Describel.html . Authors of the present paper tabulate the panel data for the filing estimation.
CYCLE (Count Model)	Business Cycles. Calculated as the number of months fall into economic upturns within one year divided by 12. Source: The Business Cycle Dating Committee of the NBER defines the business cycles. Available World Wide Web: (http://www.nber.org/cycles.html)
CYCLE (probit Model)	Business Cycles. Source: The Business Cycle Dating Committee of the NBER defines the business cycles. Available World Wide Web: (http://www.nber.org/cycles.html)
CAP	Industry capacity utilization ratio. Source: <i>Survey of Plant Capacity</i> provided by the United States Department of Commerce.
IMPR	Percentage change in import-penetration ratio. Source: <i>U.S. Commodity Exports and Imports as Related to Output</i> published by United States Bureau of the Census.
DEFICIT	Trade deficit of the industry under investigation. Source: <i>U.S. Commodity Exports and Imports as Related to Output</i> published by United States Bureau of the Census.
SIZE	The size of petitioning industry measured by the value of industry shipments. Source: <i>Annual Survey of Manufactures: Statistics for Industry Groups and Industries</i> .
JAPAN	Dummy variable with value of 1 when case is filed against Japanese exporters and 0 otherwise. Information provided at http://darkwing.Uoregan.edu/~bruceb/Describel.html
DEVG	Dummy variable to distinguish the developing country and the developed country. Source: <i>World Investment Report 1994</i>

Data Appendix (cont.)

CUMUL Dummy variable with value 1 for cases reach final ITC determination in and after 1984 and 0 otherwise. The date of final ITC determination for each case is provided by Dr. Blonigen at <http://darkwing.Uoregan.edu/~bruceb/Describel.html>

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